



SATURDAY, JUNE 20, 1874.

## Todd's Improved Car Coupler.

The engravings herewith represent an improvement of the coupler which was illustrated in the RAILROAD GAZETTE of March 14, of the current volume. The improvement consists in an arrangement by which one link is always retained in a pocket, D, cast in the draw-head. A lug, F, prevents it from being removed from this pocket, and when not used it is slipped back into the position shown in fig. 1 and fig. 3. The object of the invention is to prevent the loss of links. The engravings are so clear that no further description is necessary. Messrs. Williams, Page & Co., of Boston, are manufacturing these couplers and will furnish further information regarding them.

## Transportation in Congress.

In the Senate on the 10th:

Mr. Cameron, of Pennsylvania, presented a memorial from citizens of his State asking an appropriation for the improvement of the Susquehanna River. Referred to the Committee on Transportation.

Mr. Windom, of Minnesota, presented resolutions of the New York Chamber of Commerce in favor of the passage of the bill for the construction of the Fort St. Philip Canal. Referred to the Committee on Transportation.

In the Senate on the 13th:

Mr. West, from the Committee on Transportation, reported

bill, appropriating \$25,000 for the survey of such a canal. Referred to the Committee on Appropriations.

A resolution instructing the Committee on Appropriations to report amendments to the River and Harbor bill for the survey of the routes recommended by the Transportation Committee was agreed to—Yeas, 42; Nays, 6—Messrs. Bayard, Cooper, Hamilton (Md.), McCreery, Merrimon and Saulsbury voting in the negative.

In the Senate, on the 16th:

Mr. Bogey, of Missouri, called up the House bill making additions to the 15th section of the act of July 2, 1864, amendatory of the act to aid in the construction of a railroad from the Missouri River to the Pacific Ocean. This bill provides that any officer or agent of the companies authorized to construct these roads, or engaged in operating either of them, who shall refuse to operate or use the road or telegraph under his control for all purposes of communication, travel and transportation, so far as the public and the Government are concerned, as in one continuous line, or shall refuse, in such operation and use, to afford and secure to each of said roads, equal advantages and facilities as to rates, time or transportation, without any discrimination of any kind in favor of or adverse to the road or business of any or either of said companies, shall be deemed guilty of a misdemeanor, and, upon conviction hereof, be fined not exceeding \$1,000, and be imprisoned not less than six months. The bill further provides that in case of the failure or refusal of the Union Pacific Railroad, or either of said branches, to comply with the requirements of the act, the party injured or company aggrieved may bring action and be entitled to judgment for treble the amount of all excess of freight and fares collected by the defendant, and for treble the amount of damages sustained by plaintiffs by such failure or refusal, and for every violation of the act a new cause for action shall arise. The bill further provides that the Denver Pacific Railway Company shall be deemed part and an extension of the Kansas Pacific, to the point of junction thereof with the Union Pacific Railroad at Cheyenne.

Mr. Frelinghuysen, of New Jersey, moved to amend by striking out the clause fixing the fine of \$1,000 and imprisonment not less than six months. Rejected. He also moved to strike out the provision that the judgment might be treble the amount of all excess of freight, &c. Rejected.

one on the closely allied subject of the "Resistance of Beams to Flexure." Mr. G. W. R. Bayley, of New Orleans, gave a paper describing the ship worm known as the teredo, its appearance, habits and effects on submerged timbers, having special reference to the long bridges of the New Orleans, Mobile & Texas Railroad, where piles 15 and 20 inches in diameter were ruined in less than two years.

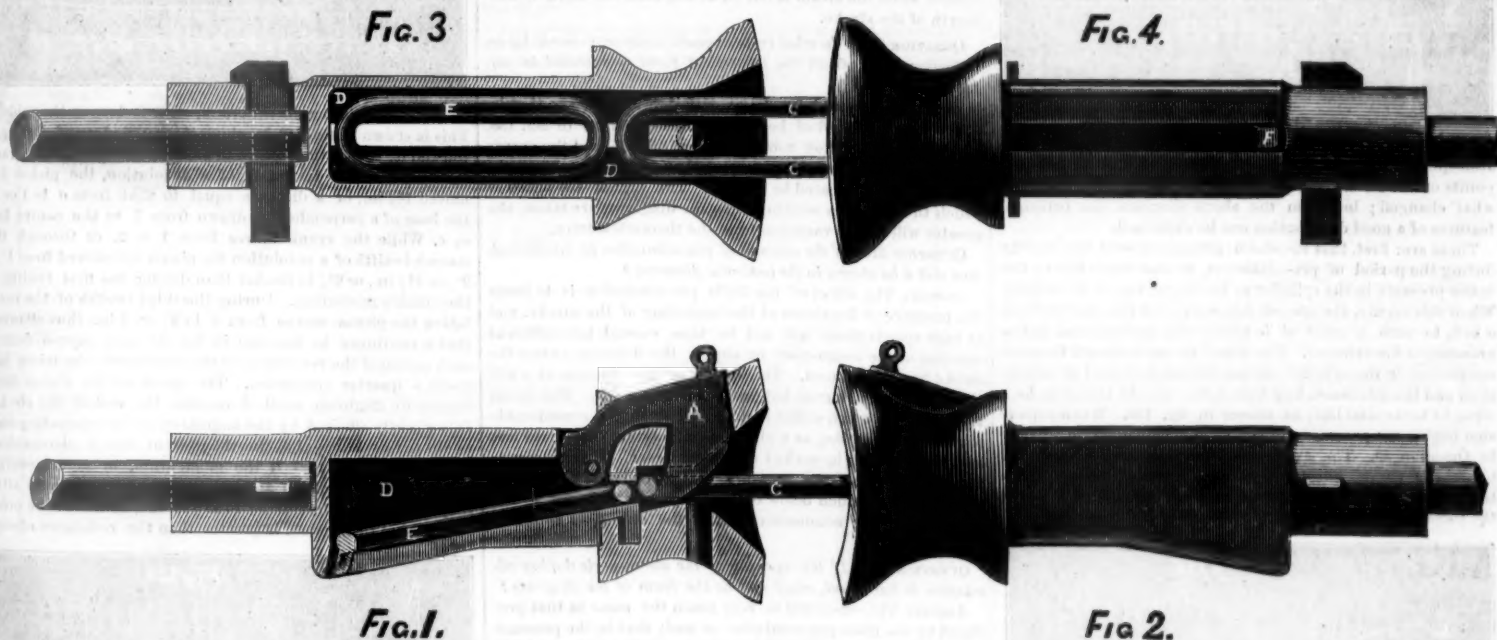
Mr. Martin Coryell described the fire in the coal mines of Kidder's Slope, which it is attempted to extinguish by steam from boilers at various points on the surface. Examples of coal-mine fires which burned from five to twenty years were cited.

Mr. John Van Buren, of New York, described the "Water Front of New York" its past and present dock systems, and the system which the Department of Docks is now beginning to carry out.

The real business of the convention was transacted on Wednesday, Thursday being devoted to visits to points of engineering interest in and about New York, beginning with a visit to the work on the docks at Christopher street and to the Stevens Institute of Technology at Hoboken, where Prof. R. H. Thurston exhibited and gave a very interesting description of the famous Stevens Battery. Thence the members were carried by a ferry boat to the sea-wall on the Battery and to the piers of the East River Bridge, one of which was ascended by many members. The next object visited was the excavations at Hell Gate, whence a number inspected in a special train the Fourth avenue improvement.

The annual supper took place in the evening of Thursday, in Tammany Hall, Mr. W. E. Worthen acting as Toast Master. Speeches were made by the President, Horatio Allen, Mr. W. Milnor Roberts, President F. A. P. Barnard, of Columbia College, and others.

The great excursion was one to the Wyoming coal region of Pennsylvania, which lasted several days, but which a large number of the members present at the Convention did not join. There were nearly fifty in the party, however, which started from Jersey City on the morning of Friday, by the Delaware, Lackawanna & Western Railroad, reaching Scranton in the afternoon. Several engineers engaged in or familiar with this coal district were with the party, and these gave the information which enabled the party to understand as well as see the great works connected with the production of anthra-



TODD'S IMPROVED CAR COUPLER.

adversely on the House bill providing for the construction of the Fort St. Philip Canal, and the committee was discharged from its further consideration.

He also reported from the same committee an amendment to the River and Harbor Appropriation bill, which provides for the appointment by the President of a board of engineers to be composed of two from the army, two from the coast survey, and three from civil life, which board shall make a survey of the mouth of the Mississippi River with a view to determine the best method of obtaining and maintaining a depth of water sufficient for the purposes of commerce, either by a canal from said river to the waters of the gulf, or by deepening one or more of the natural outlets of said river, and said board shall make a full and detailed estimate and statement of the cost of each of said plans, and shall report the same, together with their opinion thereon, showing which of all said plans they deem preferable, giving their reasons therefor, to the Secretary of War, to be presented at the commencement of the second session of the XLIIIrd Congress. The amendment proposes to appropriate \$50,000, or so much thereof as may be necessary, to defray the expenses of said survey. Placed on the calendar.

Mr. Wright, of Iowa, from the Judiciary Committee, called up the House bill providing for the collection of money due the United States from the Pacific railroad companies.

The amendments reported by the Judiciary Committee were agreed to, and the bill was passed.

This bill directs the Secretary of the Treasury to require from the Pacific railroad companies to which Government bonds have been issued the payment of all sums due or to become due for the 5 per cent. of net earnings provided by the acts relating to such companies; and in case the companies neglect to pay within 60 days after demand, the Attorney General is directed to begin suit therefor.

In the Senate on the 15th:

Mr. Kelly, of Oregon, from the Committee on Railroads, reported with amendments the bill granting to the Wabash & Jordan Valley Railroad Company the right of way through the public lands for the construction of a railroad and telegraph line. Placed on the calendar.

The Senate then proceeded to the consideration of the resolution instructing the Committee on Appropriations to report amendments to the River and Harbor Appropriation bill for the survey of four routes from the Mississippi River to the Atlantic seaboard, recommended by the Special Committee on Transportation.

Mr. Pratt, of Indiana, was opposed to Congress entering upon the work of improvement recommended by the Committee, as the present financial condition of the country would not permit it.

Mr. Mclover, of Florida, read a long argument upon the subject of cheap transportation, and recommended the construction of a ship canal across the Florida peninsula. He submitted an amendment to the River and Harbor Appropriation

bill, appropriating \$25,000 for the survey of such a canal. Referred to the Committee on Appropriations.

Mr. Tipton, of Nebraska, moved to amend so as to provide that the Denver Pacific Railroad shall extend to the Union Pacific Railroad such equal advantages and facilities as to time and transportation as are established by this act between the Union Pacific and Kansas Pacific Railroads. Rejected.

The bill was then passed, without amendment, as it came from the House.

## Convention of American Society of Civil Engineers.

The sixth annual convention of this Society was called to order at Tammany Hall, New York, on the morning of Wednesday, June 10, by the President, Col. Julius W. Adams, of Brooklyn, N. Y., with Mr. Gabriel Leverich as Secretary. There were in attendance more than one hundred members from various parts of the country.

The time of the convention on Wednesday was taken up almost exclusively by the reading of the numerous papers whose names have been announced, and by the reports of the special committees, which were themselves papers. There was little discussion, for want of time, and a report of the proceedings is therefore brief. Some of the papers we hope to publish hereafter.

The morning of Wednesday was chiefly taken up by the reading of the report of the Form, Weight, Manufacture and Life of Rails Committee, by its Chairman, Mr. Ashbel Welch, of Lambertville, N. J. This report was intended as a preliminary one, as the replies to the circular for information sent to the members of the Society and others by the Committee were not yet complete, and a final report is intended a year later. The report as read, however, gives the conclusions from the experience of the members of the Committee, and especially of Mr. Welch, whose knowledge of the subject is the fruit of an experience and study almost co-extensive with the history of American railroads.

Another committee report, and that probably of the most popular interest, as bearing on a subject prominent before the public at that time, was that on the Failure of the Williamsburg Dam, made by James B. Francis, of Lowell, Mass., as Chairman. The Committee was appointed especially to examine into the construction of the dam and report upon the causes of its failure. This committee found that the work virtually had no engineer, and that its construction was grossly defective.

Captain James B. Eads' paper on "Upright Arched Bridges" was of unusual interest at this time as an exposition of principles which governed the author in his just completed great work, the St. Louis Bridge, probably the costliest bridge structure in the world. Bridge engineering received its full share of attention, Mr. Francis Callagwood contributing a paper on the Brooklyn anchorage of the East River suspension bridge, Mr. C. Shaler Smith one on "Strains in Draw Bridge Spans and Turntables," and Gen. J. G. Barnard

cite coal. They visited a colliery the day of their arrival. Early Tuesday a New Jersey Central train took them through Wilkesbarre to Ashley, where the shops of the railroad company were examined, after which the engineers ascended the Ashley inclined planes to the top of Wilkesbarre Mountain; at the summit of each plane are immense engines for lifting the trains, one with forty boilers and of 5,000 horse power at the summit of the second plane. The party returned to Wilkesbarre to dinner, examined the wire-rope manufactory of the Hazard Company, visited some of Wilkesbarre Coal & Iron Company's mines (one of them burning). The party remained in Wilkesbarre Sunday, and, such as did not leave for their homes in other directions, returned to New York Monday by way of Manahunk, the Switch Back, and the Bethlehem Iron Works.

This excursion, unusually long and presenting a very large number of features of great interest to engineers, was conducted under the direction of Mr. James Archibald, Chief Engineer of the Delaware, Lackawanna & Western Railroad, as Chairman of the Excursion Committee.

[Entered according to Act of Congress, in the year 1874, by the RAILROAD GAZETTE, in the office of the Librarian of Congress, at Washington.]

## CATECHISM OF THE LOCOMOTIVE.

By M. N. FORNEY, Mechanical Engineer.

## PART X—(CONTINUED).

## THE VALVE GEAR.

QUESTION 211. What should be the form of an indicator diagram, if the steam is distributed by a link motion so as to produce the best practicable action in the cylinders?

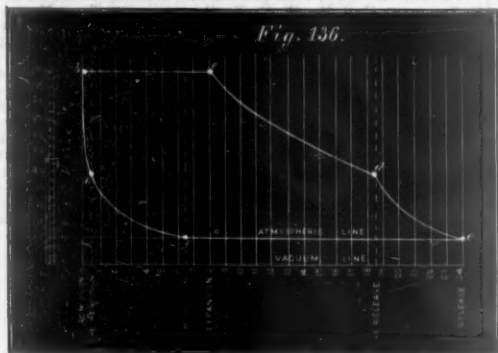
Answer. It should approximate to that shown in fig. 136. In this diagram the vertical lines represent inches of the stroke, and the scale on the left the steam pressure in pounds per square inch. The atmospheric and vacuum lines are also indicated, as already explained in answer to Question 55. The dotted vertical lines represent the points in the stroke at which the different periods of the distribution begin. These are in the order in which they occur: 1, pre-admission; 2, admission; 3, expansion; 4, pre-release; 5, release; and 6, compression. The points on the diagram at which these periods begin are indicated by small circles. Thus at a pre-admission begins, at b admission, at c expansion, at d pre-release, at e release, and at f compression. The lines forming the outline



of the diagram will be designated for convenience of description as follows:

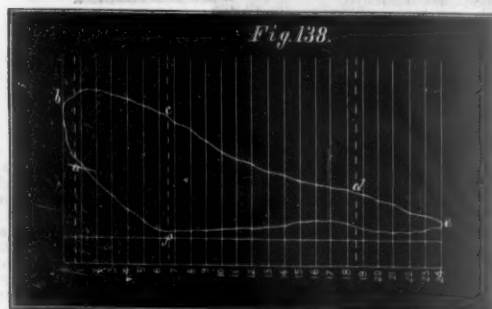
- The line from *a* to *b*, the admission line.
- " " " *b* to *c*, the steam line.
- " " " *c* to *d*, the line or curve of expansion.
- " " " *d* to *e*, the exhaust line.
- " " " *e* to *f*, the line of back pressure.
- " " " *f* to *a*, the line or curve of compression.

The diagram represents a distribution of steam produced by a valve having  $\frac{1}{2}$  in. outside and 1-16 inside lap, and operated by the link motion represented in fig. 103. The eccentrics have 5 in. throw, and the steam-ports are  $1\frac{1}{2}$  and the exhaust  $2\frac{1}{2}$  in. wide. The valve as shown by the diagram is cutting off at 8 in., or one-third of the stroke. Pre-admission begins when the piston still has  $\frac{1}{2}$  in. to move before reaching the end of its stroke. Admission of course begins with the stroke, expansion at 8 in., pre-release at  $18\frac{1}{2}$  in., release at the end of the stroke, and compression at  $17\frac{1}{2}$  in. of the return stroke. The valve is supposed to be set without any lead, or "line and line," as it is called. When the steam is cut off at 8 in. of the stroke, the valve has  $2\frac{1}{2}$  in. travel and 3-16 in. lead. The steam



pressure in the boiler is supposed to be 100 pounds above the atmosphere. Of course, when the valve cuts off at different points of the stroke, the periods of distribution will be somewhat changed; but from the above diagram the principal features of a good distribution can be explained.

These are: first, that the steam pressure should rise rapidly during the period of pre-admission, so that there will be full boiler pressure in the cylinder as the beginning of the stroke. When this occurs, the pre-admission line will rise rapidly from *a* to *b*, to such a point at *b* which will indicate full boiler pressure in the cylinder. The same pressure should then be maintained in the cylinder during the whole period of admission, and the admission line from *b* to *c* should therefore be a straight horizontal line, as shown in fig. 136. When expansion begins the pressure will fall, as was explained in answer to Question 55. The expansion line should approximate a hyperbolic curve, but if there is much loss of heat by radiation or other causes, the diagram will fall considerably below the theoretical curve. With cylinders well protected and with



dry steam the expansion line will fall slightly below a hyperbolic curve at the beginning of the period of expansion, and rise above it during the latter part of the same period. The reason of this is that the cylinder is heated by the admission of live steam of comparatively high pressure and temperature, so that, when the pressure becomes reduced by expansion, a part of the water which is condensed in the cylinder will be re-evaporated by the heat in the latter. From the point of the pre-release, *d*, to the end of the stroke, *e*, the exhaust line should fall rapidly, so that there will be no pressure behind the piston during its return stroke. To explain the theoretical form of the exhaust line would lead us into a very abstruse discussion, which would be out of place here. It will be sufficient for our purpose to call attention to the fact that the pre-release should allow all the steam in the cylinder to escape before the piston reaches the end of the stroke, so that the back pressure during the return stroke may be as low as possible. It is, however, only at comparatively slow speeds that the steam in locomotive cylinders escapes during the period of pre-release, so that the back pressure is reduced to that of the atmosphere. It is necessary in locomotives, as has already been explained, to contract the area of the blast orifices or exhaust nozzles, in order to stimulate the draft through the fire, so that the steam cannot escape with sufficient rapidity to reduce the back pressure to that of the atmosphere if the engine is running fast. Of course every pound of back pressure on the piston is so much loss of energy, and a reduction of the amount of work done by the engine; but it is a sacrifice which must be made in order to be able to generate the requisite quantity of steam. In studying the distribution of steam, however, every effort should be made to reduce the back pressure as much as is practicable, and yet maintain a sufficient supply of steam, and therefore the line of

\* That is, the steam edges of the valve correspond with the steam edges of the port at the beginning of the stroke.

back pressure should conform as closely as possible to the atmospheric line. The compression line should be a hyperbolic curve, beginning with the period of compression. In calculating both the compression and expansion, allowance must be made for the clearance space and steam-way. In a cylinder like that illustrated in fig. 92, their contents would be about equal to that of two inches of the cylinder. In calculating the expansion when steam is cut off at 8 in. of the stroke, we must take into account not only the steam which fills the space swept through by the piston, but that which fills the clearance space and the steam-way, so that instead of having a quantity of steam which will fill a cylinder 16 in. diameter and 8 in. long, we have as much as would fill a cylinder of that diameter and 10 in. long. The same thing is true of the compression. This must occur in the above example when the piston has 6 in. more to move before completing its stroke. There is therefore a quantity of steam in front of it sufficient to fill a cylinder  $8\frac{1}{2}$  in. in diameter. This steam is of course compressed by the advance of the piston, and if its pressure when compression begins is the same as that of the atmosphere, then it will be 0.9 lbs. above when the piston has only 6 in. to move and 3.2, 6.2, 10.5, 11.9, and 27.5 lbs. effective pressure when the piston has 5, 4, 3, 2 and 1 inches to move respectively, and when pre-admission begins the pressure will have risen to 35.2 lbs. If the back pressure is above that of the atmosphere, of course the compression will be correspondingly increased. It will also be seen that without any or with very little clearance space, the compression would at the end of each stroke rise above the boiler pressure. It being a peculiarity of the ordinary shifting-link motion that as the period of admission is reduced that of compression is lengthened, the latter becomes very excessive when the steam is cut off at less than one-third or one-fourth of the stroke.

QUESTION 212. In what respect would a diagram made by an indicator differ from the theoretical form represented in fig. 136?

Answer. It would be drawn with less exactness; that is, the corners instead of being sharply defined, as in fig. 136, would be more or less rounded, as in fig. 137, and the curves and straight lines would vary somewhat from the exact mathematical form indicated in fig. 136. The higher the speed at which the engine is working when the diagrams are taken, the greater will be the variation from the theoretical form.

QUESTION 213. If the amount of pre-admission is insufficient, how will it be shown in the indicator diagram?

Answer. The effect of too little pre-admission is to lower the pressure of the steam at the beginning of the stroke, and at high speeds there will not be time enough nor sufficient opening of the steam-port to supply the deficiency after the stroke has commenced. The corner of the diagram at *a* will then be very much rounded, as shown in fig. 138. This is apt to be the case when steam is admitted during a considerable part of the stroke, as a shifting-link motion then gives less lead than when it is worked nearer mid-gear. If the steam is cut off short, then the pressure in the cylinder during admission is very much below boiler pressure, and is apt to fall rapidly after the commencement of the stroke, as shown in fig. 138.

QUESTION 214. If the opening of the steam-ports during admission is too small, what will be the form of the diagram?

Answer. The effect will be very much the same as that produced by too little pre-admission or lead; that is, the pressure in the cylinder will be much lower than in the boiler and will fall rapidly during the period of admission, as shown in fig. 138.

QUESTION 215. What defects will be indicated by the expansion curve of indicator diagrams?

Answer. If the cylinders are not well protected, and there is much loss of heat from radiation, there will be a rapid fall of pressure during the period of expansion, which will be shown by the expansion curve falling below the theoretical curve shown in fig. 136. If, on the contrary, the indicator curve is much above the theoretical curve, it may be caused by a leak in the valve. As steam is quite as likely to leak from the steam-port into the exhaust as from the steam-chest into the steam-port, a valve which is not tight may produce just the contrary effect upon the indicator diagram. As it is usually quite easy to detect a leak in the valve by other means, the use of the indicator for this purpose is unnecessary. Attention is called to it, however, to show the impossibility of getting results of any value with the indicator if the valves are not steam-tight.

QUESTION 216. What should be observed regarding the exhaust line of the indicator diagram?

Answer. The most important point to be observed is, whether the pressure at the end of the stroke is reduced as low as possible, as at high speeds it is usually much more difficult to exhaust the steam from than to admit it into the cylinder. As already stated, the blast in the chimney makes it almost impossible to exhaust the steam to atmospheric pressure when the locomotive is running fast. If the steam is released too late in the stroke, as already explained, there will not be time enough nor sufficient opening of the port to allow the confined steam to escape from the cylinder before the end of the stroke, and this will be indicated on the diagram by the space between the line of back pressure and the atmospheric line during the commencement of the return stroke, as shown in fig. 138.

QUESTION 218. What should be observed regarding the line of back pressure?

Answer. The most important point is, that it should approximate as closely as possible to the atmospheric line, as all the back pressure not only diminishes the efficiency of the engine, but is a total loss of energy. Too much inside lap will increase the amount of back pressure, but generally it is more influenced by the area of the blast orifices than by any other cause. Every effort should be made, therefore, to have them

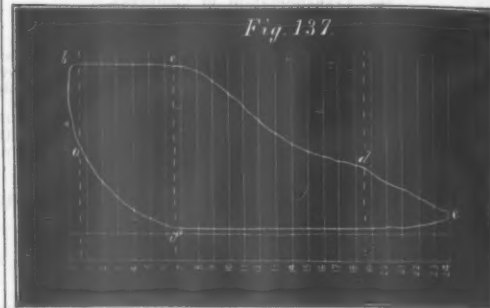
as large as possible and yet have the boiler make as much steam as is needed.

When only one blast orifice is used for both cylinders, it often happens that when the steam is exhausted from the one cylinder it "blows" over into the other, and thus produces an additional amount of back pressure. This is shown by a rise or "hump" in the line of back pressure, as indicated in fig. 139.

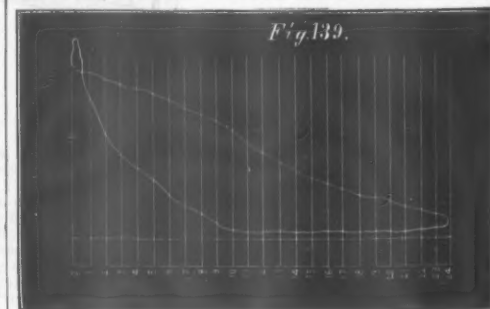
QUESTION 218. Can the amount of compression which is needed be determined by calculation?

Answer. Yes; but it involves more abstruse principles of mathematics than it is thought best to introduce here. Some of the reasons can, however, be given, which will make the subject clearer, and enable the reader, if he has sufficient knowledge of mathematics, to investigate the subject still further.

In the first place it is a well-known fact that the motion of a piston in the cylinder of a steam engine is not a uniform one, but increases in speed from the beginning of the stroke to the middle, and diminishes in speed from the middle to the opposite end. The cause of this is that the crank revolves at a uniform speed during the entire revolution, but the piston moves much less at the beginning of the stroke, with a given



amount of revolution of the crank, than it does at the middle. This is shown in fig. 140, in which *A* is a cylinder and *B* the piston and *a*, *b*, *c*, *d*, the path of the crank. Now while the crank moves from *a* to 1, or 1-12 of a revolution, the piston has moved  $1\frac{1}{2}$  in., or a distance equal to that from *a* to 1 or to the base of a perpendicular drawn from 1 to the centre line *a*, *c*. While the crank moves from 1 to 2, or through the second-twelfth of a revolution the piston has moved from 1' to 2', or  $4\frac{1}{2}$  in., or  $2\frac{1}{2}$  in. further than during the first twelfth of the crank's revolution. During the third twelfth of the revolution the piston moves from 2' to 3', or 6 in., thus showing that it continues to increase in the distance moved during each period of the revolution of the crank until the latter has made a quarter revolution. The speed of the piston then begins to diminish until it reaches the end of the stroke. It is slightly affected by the angularity of the connecting-rod, as already explained, but for the present this is disregarded. It is obvious now that if the momentum, or actual energy stored up in the piston and other reciprocating parts after they have passed the middle of the stroke, added to the pressure behind the piston, is greater than the resistance offered



by the crank, the motion of the latter will then be accelerated and thus conveyed to the moving engine and train. If, however, there is any momentum in the piston when it reaches the end of the stroke, evidently it can exert no power to cause the crank to revolve, but must be expended by producing a pressure on the crank-pin and thus on the axle-boxes. Not only will such a pressure not cause the crank to revolve, but it will make it more difficult to turn the crank with such a pressure against it than it would be without. The momentum of the piston and other reciprocating parts at the dead point therefore creates a resistance to the movement of the crank instead of helping to turn it. It will also be observed that after the crank has moved slightly from the dead point, any pressure in the piston will exert very little force which will tend to turn the crank. In fact the nearer the piston is to the end of the stroke the greater is the proportion which the friction of the crank-pin and axle bears to the useful effect of the strain in causing the crank to turn. Calculation shows that for about three degrees on either side of the dead points the effect of pressure on the crank pin is actually to retard the engine. If now the piston reaches the end of the stroke with a certain amount of unexpended momentum stored up in it, if this energy is expended by producing pressure on the crank, then it will not only be a waste of energy but a double waste by retarding the motion of the crank. If, however, this energy can be absorbed by compressing steam which will fill the clearance spaces, it will not only prevent the retarding effect referred to, but the energy in the piston and other parts will be converted into steam pressure, which will be given out in useful work during the next stroke. It would, of course, be impossible to arrest the motion of the piston instantly, and therefore its momentum is gradually absorbed from the time compression begins until it reaches the end of the stroke. As the energy of a moving



body is equal to its weight multiplied by the square of its speed, it is obvious that to overcome this a different amount of compression would be required for each speed, and also that it must be adjusted to the weight of the moving parts. Such exact adaptation is not practicable on locomotives, nor does the link motion enable us to alter the amount of compression with so much exactness: but the explanation shows the value of increasing the amount of compression with the speed, which fortunately the peculiarities of the link motion enable us to do without difficulty.

**QUESTION 219.** What cause produces the form of diagram represented by Fig. 139?

**Answer.** It is produced by excessive compression, which causes the pressure in the cylinder to rise above boiler pressure before pre-admission begins. As soon as the port is opened, part of the steam in the cylinder flows back into the steam-chest, and thus the pressure is reduced, as shown by the diagram.

**QUESTION 220.** How can we determine whether the steam is distributed in the cylinders to the best advantage, and how can we discover the fault, if there is one, in the link motion?

**Answer.** The indicator will show the action of the steam in the cylinder, and motion-curves drawn with the instrument described in answer to Question 187 will show the exact movement of the valve. By comparing the indicator diagram with the motion-curves, the one will show the defects in the other.

**QUESTION 221.** To what extent can the movement of the valve be modified by alterations in the proportions of the link motion?

**Answer.** The motion of the valve is susceptible of an almost infinite number of changes, by different variations and combinations of proportions of the working parts of the link-motion. These changes are, however, limited by the general laws which govern the motion of eccentrics, and therefore cannot influence the motion of the valve beyond certain limits. Hardly any variation can be made either in the proportions or arrangement of the working parts which will not have some influence upon the movement of the valve. Aside from the proportions of the valve itself, which have already been discussed, the throw of the eccentrics, the length of the rods and

varies as the end of the lifting arm is raised or lowered. In designing valve gear it is usually tested by a full-sized model, which will show the exact motion of all the parts. The best position for the lifting shaft and the length of its arm can be determined perhaps most satisfactorily by placing the link in full gear forward, then moving the point of suspension of the upper end of the link-hanger so that the front and back admission will be alike, and then marking this position. The same process can be repeated for both half gear and for the shortest point of cut-off. If the position of the lifting shaft and the length of its arm are then so arranged that the end of the latter will move through the three points which have been thus determined, the admission will be very nearly equal for each end of the cylinder. Usually, however, it is impossible to arrange the shaft and arm so that they will conform exactly to these conditions, and therefore an approximation is made which will curve as near as possible to what is required. It may be stated, however, that the lifting shaft should be kept as low as possible, so as not to interfere with the eccentric-rods. In some cases the shaft has been suspended from the boiler, so that the outside eccentric-rod would work past or over the end of the lifting shaft, thus allowing the latter to be located lower than would otherwise be possible.

#### United States Railroads in 1873.

The portion of the introduction to Poor's "Manual of the Railroads of the United States" for the current year was afterwards found by the compilers to be erroneous in many particulars, so much so that we feel compelled to publish it as corrected, and to caution our readers against using the figures printed last week. The corrections are partly additions, but not all so:

The tabular statements, on the preceding pages, present full abstracts of the share capital, indebtedness, earnings, expenses, dividends, etc., etc., of the railroads of the United States for 1873. The total length of line, of which operations are given, is 66,237 miles against 57,323 miles for 1872, and 44,614 for 1871. The aggregate cost of the several roads at the end of the year was \$3,784,549,094, against \$3,159,423,057 for 1872, and \$2,664,627,645 for 1871. The increase of cost for 1873

seems to be no limit to the increase of earnings, even with a stationary population, provided such population be intelligent and provided with all the aids to industry which science and art can supply.

One cause for the vast mileage that has been built in the past few years, and of the comparatively low rate of earnings upon the aggregate cost of our railroads, has been the extraordinary effort to complete roads to save from lapsing the vast grants made by Congress in their favor. These grants were on condition that the roads in whose favor they were made should be built within a certain number of years. As they were made to nearly 10,000 miles of line, and were supposed to be very valuable, nearly all the roads to which they were assigned have been built. No land-grant roads of any considerable length are now likely to be built at all except the Northern and Southern Pacific, each of which have extensive grants in their favor. That a large quantity of land can be found unoccupied in the immediate vicinity of a railroad implies a very sparse population. The land-grant roads were, however, mostly through a prairie soil, which is easily and rapidly brought into cultivation; but some time must often elapse before a population will be found upon them sufficiently numerous to supply a traffic required to meet the immediate calls for interest or for other objects. Although the lands may be very valuable, experience has shown that they can be converted only slowly into money.

The mileage of railroads in the New England group of States for 1873 was 5,303, against 4,574 for 1872. Their cost was \$263,697,778, against \$230,609,794 in 1872, and was made up of \$141,473,329 of share capital, and \$122,224,449 of debt. Their average cost per mile was \$48,882, against \$50,418 for 1872. Their gross earnings were \$51,676,688, against \$48,519,835 for 1872. Of the gross earnings \$29,310,643 were received for the transportation of freight, and \$22,366,045 for the transportation of passengers. The percentage of gross earnings to the cost of the roads was 19.6 per cent. The net earnings were \$15,061,777, and equalled 2.92 per cent. of such cost. The earnings per head of population equalled \$14.30, against \$13.53 for 1872. The dividends paid amounted to \$9,004,488, and equalled 6.36 per cent. on the total capital. The ratio of total mileage to population was one mile of line to every 685 inhabitants, against 709 for 1872.

The mileage of the railroads in the Middle group of States for 1873 was 12,441, against 11,617 for 1872. Their cost was \$1,126,702,107, against \$922,700,774, and was made up of \$649,503,037 share capital, and \$477,199,070 of debt. Their average cost per mile was \$90.18, against \$79,427 for 1872. Their gross earnings were \$194,032,302, against \$169,205,702 for 1872. Of the gross earnings \$151,697,072 were received for the transportation of freight, and \$42,335,230 for the transportation of passengers. The percentage of gross earnings to the cost of the roads was 17.4. The net earnings were \$69,280,583, and equalled 6.22 per cent. of such cost. The earnings per head of population equalled \$18.00, against \$15.86 for 1872. The dividends paid amounted to \$36,531,343, and equalled 5.6 per cent. on the share capital of the roads. The ratio of total mileage to population was one mile of line to 772, against 792 for 1872.

The mileage of the railroads of the Western States for 1873 was 32,973 miles, against 28,778 for 1872. Their cost was \$1,730,728,224, against \$1,472,625,332 for 1872, and was made up of \$846,933,411 of share capital, and \$883,794,813 of debt. Their average cost per mile was \$52,490, against \$50,558 for 1872. Their gross earnings were \$211,717,781, against \$183,826,252 for 1872. Of these \$51,620,779 were received for the transportation of freight, and \$160,097,002 for that of passengers. The percentage of gross earnings to the cost of the roads was 12.23. The net earnings were \$72,464,212, and equalled 4.19 per cent. of such cost. The earnings per head of population equalled \$14.33, against \$13.76 for 1872. The dividends paid amounted to \$19,055,247, and equalled 2.35 per cent. on the share capital of the roads. The ratio of total mileage to population was one to 406 against one to 433 for 1872.

The mileage of the railroads of the Southern States for 1873 was 13,908, against 10,986 for 1872. Their cost was \$509,324,106, against \$491,913,267 in 1872, and was made up of \$228,477,107 of share capital and \$280,846,999 of debt. Their average cost per mile was \$36,772, against \$36,575 for 1872. Their gross earnings were \$53,696,409, against \$47,888,539 for 1872. Of the earnings, \$38,385,420 were received for the transportation of freight, and \$15,310,989 for that of passengers. The percentage of gross earnings to the cost of the roads was 15.4, the net earnings were \$18,133,349, and equalled 3.5 per cent. on such cost. The earnings per head of population equalled \$4.21, against \$4.31 for 1872. The dividends paid amounted to \$901,386, and equalled only 0.4 per cent. on the share capital of the roads. The ratio of total mileage to population was 735, against 779 for 1872.

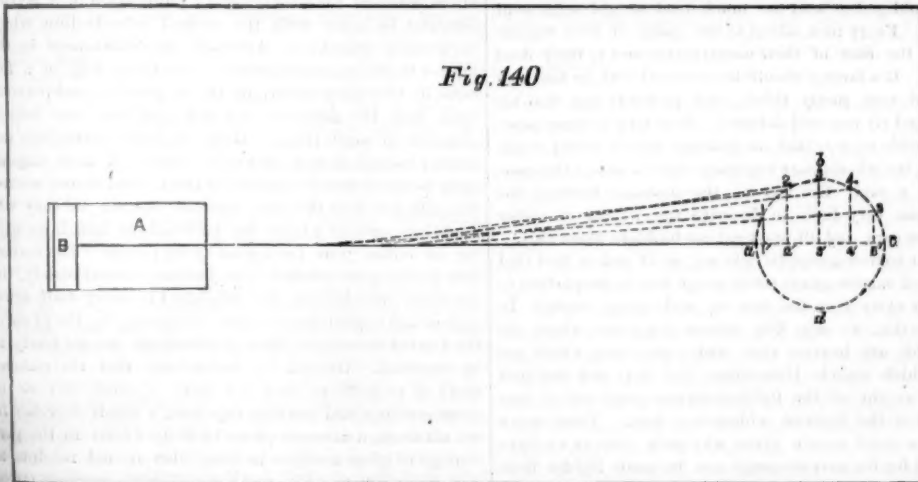
The mileage of the railroads of the Pacific States for 1873 was 1,612, against 1,368 for 1872. Their cost was \$154,000,809, against \$131,573,990 in 1872, and was made up of \$81,251,700 of share capital, and \$72,839,109 of debt. Their average cost per mile was \$95,590, against \$98,300 for 1872. The gross earnings were \$15,276,747, against \$13,900,727 for 1872. Of the gross earnings, \$9,682,789 were received for the transportation of freight, and \$5,593,958 for the transportation of passengers. The percentage of gross earnings to the cost of the roads was 9.9; the net earnings were \$8,858,639, and equalled 5.7 per cent. on such cost. The earnings per head of population were \$17.92, against \$17.00 for 1872. The dividends were \$1,628,265—equal to 2 per cent. on the capital invested. The ratio of total mileage to population was one mile to each 399 of inhabitants, against one to each 379 for 1872.

Within the past five years 28,396 miles of railroads have been constructed in this country. At \$50,000 per mile the cost of these works has been \$1,381,850,000. In the meantime \$75,000,000 have been annually expended in enlarging the accommodations and increasing the facilities for business of roads already in operation—in other words, there has been expended upon our railroads \$350,000,000 annually in the last five years. If we have not exceeded our means in the construction of these works, we have pushed this great interest out of all proportion to others. We have only to stop construction to have the equilibrium speedily restored. The method is a very simple one. The earnings of the railroads of the Western States the past year equalled \$14.33 per head of population. The present year, but for the effect of the recent panic, they would equal \$15.33 per head; and in 1875, \$16.33 per head. This gain is certain to be made as soon as the country recovers from the present prostration. In the meantime, population is increasing at the rate of more than one million annually. The contribution of this increase alone, to railroads, will add, at the present rate of earnings, \$14,330,000 annually to their gross receipts. But the population of the country increases at the rate of about 2.50 per cent. annually, while the earnings of our railroads increase in about fivefold greater ratio. The question of earnings is one of population, the pioneer contributing as much, per head, as a citizen of old and densely-settled States.

#### Will of Asa Whitney.

The will of the late Asa Whitney, the car-wheel manufacturer of Philadelphia, which was admitted to probate June 12, gives \$50,000 to the trustees of the Pennsylvania University for the endowment of a professorship of Dynamical Engineering, \$20,000 to the Old Men's Home, \$10,000 to St. Luke's Church for a pastor's residence, \$2,500 for a chapel, and \$5,000 to the Children's Seashore House at Atlantic City.

Fig. 140



of the link, the point of connection of the rods with the link, the point of suspension, the position of the lifting shaft, the length of the arms, the length and position of the rocker arms will each of them effect the distribution of steam. The number of combinations of all these different proportions is of course almost infinite, and therefore any full discussion of them will be impossible here.

**QUESTION 222.** What are the most important points which require attention in designing a link motion?

**Answer.** First, the lead and the period of admission should be the same for each end of the cylinder, for each point of cut-off, and, if possible, in back as well as forward gear.

Second, the width of opening for both admission and exhaust should be as large as possible when steam is cut off short.

Third, the exhaust or pre release should occur early enough and be maintained long enough to reduce back-pressure as low as possible.

**QUESTION 223.** How can the lead and period of admission be equalized?

**Answer.** It is impossible to make the periods of admission absolutely alike for every point of cut-off in both fore and back gear. It is therefore customary to disregard the back gear, as engines are worked but little with the link in that position. Even for full gear the periods of admission cannot be made exactly alike for each end of the cylinder for each point of cut-off, and therefore it is usual to make the periods of admission for half-gear forward, in which position the link is worked most.

The periods of admission for the front and back ends of the cylinder can be changed most in relation to each other by altering the position of the point of suspension on the link. This can be done either by moving it up or down, or horizontally. Usually links are suspended from a point halfway between the points of connection of the eccentric-rods, and from  $\frac{1}{2}$  to  $\frac{3}{4}$  in. back of the center line of the slot in the link. A somewhat better distribution can be secured by suspending it about 8 in. above the center, but the suspending link must then be made so short that it is subjected to very great strains by the motion of the link, and this evil is usually considered much greater than the advantage which is gained thereby in the more equal distribution. The point at which the upper end of the suspension link is hung also influences the relative amount of admission front and back. This point, of course,

over 1872 was \$625,119,977; over 1871, \$1,119,915,359. Of the total cost \$1,947,638,584 was made up of share capital, and \$1,836,904,450 of various forms of indebtedness, chiefly of bonds maturing at a distant day. The proportion of share capital to debt was 51.5 to 48.5. The average cost per mile of all the roads was \$57,134 against \$55,116 for 1872, and \$59,726 for 1871. The total gross earnings for the year were \$526,419,635 against \$468,241,055 for 1872, and \$403,329,208 for 1871. The increase of earnings for 1873 was \$53,178,880; for 1872, \$64,911,847; the total for the two years being \$123,090,727. The percentage of increase for 1873 over 1872 was 12.4; for 1872 over 1871, 16.1 per cent. The percentage of increase in the two years was 30 per cent. Of the total earnings for the year, \$389,035,508 were received for the transportation of freight and mails, and \$137,384,427 for the transportation of passengers—the proportion of the former to the latter being as 74 to 26. The current operating expenses were \$342,609,373, or 65.1 per cent. of the gross earnings. The net earnings were \$183,810,562, or 34.9 per cent. of the gross. The latter equalled 13.91 per cent. of the cost of the roads—the net 4.85 per cent. The amount paid in dividends was \$67,120,709, or 3.45 per cent. on the aggregate amount of the share capital. The gross earnings per head of population equalled \$12.80 against \$11.63 for 1872, and \$9.80 for 1871. The ratio of total mileage to inhabitants in 1873 was one mile of road to every 582 inhabitants, against one mile to 600 inhabitants for 1872.

The percentage of gross earnings on the total cost of the roads was 13.91 against 15 for 1872, and 15.14 for 1871. The ratio is 1.09 less than that for 1872, 1.23 less than that for 1871. The percentage of net earnings upon the cost of the roads for 1873 was 4.85 against 5.20 for 1872, and 5.32 for 1871. The increase of mileage in the two years for which returns are given has been 21,623 miles. The increase of the cost of the roads in the same time has been \$1,119,915,359. It was hardly possible that the earnings should increase in ratio to such an enormous expenditure, as two or three years often elapse after its opening before a railroad is in position to do much business, for the want of adequate equipments, or from the unfinished condition of its tracks, or from the want of suitable connection, or from pecuniary embarrassments. On the other hand, the earnings of these works, per head of population, in 1873, was \$12.80 against \$11.63 for 1872, and \$9.80 for 1871. This is a most encouraging feature in connection with these works, as it shows that under ordinary conditions their earnings must increase, for an indefinite period, in a very rapid ratio, the increase per head in the Eastern more densely settled States being fully as great as in the Western and more sparsely settled States. At the rate of the past three years the earnings of our railroads will double themselves in the next six years without the construction of an additional mile of line. The population is increasing at the rate of one million annually. By 1880, the earnings of the roads now in operation will probably exceed \$1,000,000,000. The percentage of their annual earnings to their cost will come fully up to 20 per cent.—a ratio which, with good management, is sufficient to render the whole investment sufficiently remunerative. In fact, there





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## Editorial Announcements.

**Addresses.**—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

## THE NARROW-GAUGE FALLACY.

In one of the delightful books written by Sir Arthur Helps, "Friends in Council" agree each of them to say what they would desire most, in case it were possible that their wish for the improvement of the condition of mankind could be carried out. After each of them had expressed some cherished method of reform, the question was put to "Sandy," a shrewd Scotchman, whose wish was that "the world might be governed by right reason." This answer is very apt to recur very often to a person who reflects much upon the ways of mankind. If the amount of evil which results from wrong reason could be summed up, it would be a record too long and melancholy ever to be read or realized.

In speaking of wrong reason, we do not refer to that sort of error which results from ignorance of the premises on which conclusions rest, but to that which is the result of false inferences from well-known facts. One of the most remarkable cases of this kind is that which forms the above title. As we have frequently pointed out, the whole argument in favor of the narrow-gauge system rests upon the assumption, that cars to carry a comparatively light load, say from one-half to two-thirds as much as ordinary cars, and of equal strength, will weigh very much less if they have short axles than they will if the axles are longer. Upon this false inference the whole elaborate system of reasoning of the narrow-gauge advocates rests and may be summarized as follows:

1. If the rails are three feet apart, the cars will weigh one-third less than if they are 4 ft. 8½ in. apart.
2. If the cars weigh so much less, the rails may be lighter and cheaper, the cross-ties can have less bearing surface, and therefore be shorter, the bridges and culverts of less strength and of corresponding cost.
3. If the cross-ties are shorter, the embankments and cuts may be built with less width and expense.
4. If the cars weigh less, the locomotives may be lighter and will therefore be cheaper.

Therefore, a narrow-gauge road will cost very much less than one with a wide gauge.

Now, at the risk of some repetition, suppose the first postulate is changed, and the argument is presented as follows:

1. If the rails are only three feet apart, the cars will not weigh less than they will if their gauge is 4 ft. 8½ in.
2. If the cars do not weigh less, the rails cannot be lighter or cheaper; the cross-ties must have the same bearing

surface, and must therefore be of the same length, and the bridges and culverts of the same strength and cost.

3. If the cross-ties are not shorter, the embankments and cuts must be built with the same width and expense.

4. If the cars do not weigh less, the locomotives cannot be lighter nor cheaper.

Therefore, a narrow-gauge road will not cost less than one with a wide gauge.

It will be observed that each one of the subsequent inferences rests upon the first, and therefore each of them, and consequently the final conclusion, depends entirely upon the truth or falsity of the first assumption. It is with just such reasoning as this that the advocates of the narrow gauge have urged their schemes, and tried to show that it was best to build roads with the rails nearer together, instead of putting them the usual distance apart. We should have not referred to this subject again, which has already been very fully discussed in the RAILROAD GAZETTE, were it not that, since the recent financial check to railroad building and railroad profits, the narrow-gauge fallacy has again revived and the discussion broken out with renewed virulence, in some of the more obscure papers. Undoubtedly it is difficult to induce people with money to invest it in new railroad projects, therefore, as life insurance solicitors say, it is necessary to get a new "twist" on the subjects who are "approached." The plea used is that the old roads do not pay because they cost too much, but that narrow-gauge roads are sure to pay because the cars weigh so much less, etc., etc., etc.

Now supposing these narrow-gauge logicians should go to the good farmer, who wants railroad facilities to carry his grain to market, and who complains of the great expense of hauling, or as they say at the West, of drawing it to market, in his wagon, and should say: "My dear sir, the reason it costs you so much to carry your grain to market is because the gauge of your wagons is too wide. You are now obliged to haul too much dead weight with your produce. Every inch added to the gauge of your wagons adds to the cost of their construction and to their dead weight." If a farmer should be reasoned with in that way he would very justly think, and probably say, that his good friend (?) was well-deluded. Now why is it any more unreasonable to say, that an ordinary wagon would weigh less with the wheels near together, than to assert the same thing of a car? The fact is, the distance between the wheels has very little to do with the weight of either wagons or cars, and all practical car-builders know this.

But our narrow-gauge friends say, is it not a fact that the cars of narrow-gauge roads weigh less in proportion to what they carry than the cars on wide-gauge roads? In answer to this, we say: Yes, narrow-gauge cars which are very light, are heavier than wide-gauge cars, which are heavy (which sounds Hibernian); but it is not true that the dead weight of the lightest narrow-gauge cars is less than that of the lightest wide-gauge cars. There never has been a good reason given why such cars as we have described for the narrow-gauge can be made lighter than for the standard gauge, for the simple reason that there is no such reason; and therefore if the world were controlled by right reason we believe there would not be any narrow-gauge roads built.

We of course do not say that it is impossible to construct and operate a narrow-gauge road and do a profitable business on it; what we are contending against is the folly of introducing a new gauge into the country at this time, just as we have arrived at a point when it seems probable that all the roads will be brought to the common standard of 4 ft. 8½ in. If there was any material advantage to be gained by adopting a new gauge, of course there would be some excuse for introducing the new system and new confusion, but when it is possible to build roads just as cheaply of the ordinary gauge with light rolling stock, light rails and light locomotives, it seems the height of folly to give up the existing uniformity for an imaginary advantage for which quite curiously no one can give a good reason.

It is also quite singular to see not only that people refuse to be governed by right reason, but that they go to a great deal of trouble to make what would otherwise be very simple very obscure. Take as an illustration the following example of catechetical reasoning copied from one of the reports of the Denver & Rio Grande Railway:

"Why not adopt the reformed cars on a new road, adhering to the wide gauge? Because the great advantage claimed for adhering to the gauge is simply the avoidance of transshipment, and this could not be gained practically, because the cars of other companies could not be carried unless in separate trains, which is out of the question, and the new light cars could not be run off their own line with any advantage."

It is said that at the time Charles Lamb was employed in the office of the East India Company some one complained to him that he came to the office very late in the morning. "Yes," he said, "it is true; I do—but I go away very early in the evening." The person who complained went away with a vague feeling that there was something wrong about the reasoning of Lamb's reply, but for the life of him could not tell what it was. The above argument doubtless has had very much the same effect on many who have read it. The fact is, we would be obliged to write much more than we have room for, and probably

more than our readers would have patience to read, in order to show the utter fatuity of the reasoning which refuses to adopt the standard gauge because with it it would be possible to transship, and finds in that fact a reason for the narrow gauge, because then it will be impossible to do so.

What we want to urge as strongly as we can is, that cheap railroads can be built of the standard gauge so as not to cost any more than narrow-gauge roads. Let the projectors of such lines write to locomotive builders and get the prices and capacity of narrow-gauge engines, and then inquire what would be the cost of locomotives with the same cylinders, boilers, wheels, etc., the only difference being that they shall be adapted for the standard instead of a narrow gauge. Then let them inquire of car builders what the difference in cost would be for cars made with exactly the same bodies, wheels, springs, etc., excepting that the trucks of the one shall be adapted to the standard and the other to the narrow gauge. They will then be convinced, we are sure, that such rolling stock for the standard gauge can be run on rails as light as it is possible to use on the narrow gauge. Let them also inquire whether such narrow-gauge locomotives will pull heavier loads up steep grades than those similar to them for the standard gauge. If they are inclined to believe that shorter curves can be used with the rails near together than with them 4 ft. 8½ in. apart, let them learn what are the shortest curves used on narrow-gauge roads and compare them with similar curves on wide-gauge roads. Had the projectors of such roads done this long since, there would be somewhat less reason for regretting that "the world is not controlled by right reason."

## UNITED STATES RAILROAD STATISTICS FOR 1873.

The errors in the advance sheet of the introduction to Poor's Manual on which our article last week with the above title was founded compel a publication of a revised editorial to agree with the revised introduction which we publish elsewhere. Although the differences in the figures in several cases amount to millions, only in a few cases do they alter materially the proportions and percentages, and the amounts per mile are not very largely changed in most items. However, our statistics are imperfect enough at best, and in a matter of such importance as the railroad statistics of the United States, we feel compelled to give the most accurate figures, as they will doubtless serve as a basis for calculations and references for an entire year for a great many people. The correction is the more needed here because, unfortunately, the incorrect introduction was published in many daily newspapers and copied thence quite extensively by the press of the United States, and these publications are not likely to be corrected. We will say beforehand that the changes make an increase in cost per mile, a small decrease in gross earnings and working expenses, a small increase in net earnings, a decrease (from 14.33 to 13.91) in the percentage of gross receipts to cost, also in net receipts to cost (from 4.96 to 4.85), and a considerable increase (from 3.07 to 3.45) in the average dividend. This increase of dividends seems to come chiefly from taking into account last fall's dividend on Central Pacific stock. There are also considerable changes in the figures given for some of the several groups of States.

Below is our editorial of last week changed only so as to give the correct figures for those which were incorrect last week:

We are forced in this country to depend, for any general railroad statistics, upon collections privately made. One of the results of this has been that until recently we have never had such statistics which were at all accurate or extended; the figures for the length of roads being very imperfect, those for cost being guesses rather than anything else, and those for earnings, expenses and bulk of traffic being for the most part wanting. Of late years several States have required the return of certain statistics by law, and in one or two of these the returns are very full and quite accurate. The increasing interest in the question of railroad transportation while it has made the need of such statistics more felt has also encouraged the collection and perfection of them. Mr. Poor's Manual of the Railroads of the United States, for many years our sole authority on such subjects, at first did little more than to collect the information and publish it for each road separately. The tabulation and compilation of the figures for the whole country, with an analysis of the results, was very imperfect when attempted at all in the earlier numbers. Last year, however, there was such an editing of the vast mass of material as to give for the first time something like an adequate view of the railroad system of the United States, its cost, and the results of its workings.

The issue of the Manual for 1874 and 1875 is to appear next week, and of its tabulated information we can now speak only so far as is indicated by an advance sheet of the introduction which the publishers have kindly supplied us. This, however, is sufficient to indicate that the information is more complete than hitherto, covering very nearly all the roads which are in operation, while the exceptions are not only an insignificant proportion of the whole railroad system, but still more insignificant in the amount of their traffic and earnings.

Before proceeding to any consideration of the figures reported, however, it is well to ascertain for what year they are given. Owing to the manner in which the statistics are collected, without any authority but from the voluntary contributions of the railroad companies, generally contained in their annual reports, and from the official reports of certain States, covering in the case of the com-



panies fiscal years ending with almost every month in the calendar, and in that of the States years ending with December, with June, with August, with September, and perhaps still other months, owing to this heterogeneity of the materials which alone are accessible, the "year" covered by the Manual is by no means the same for every road; but the figures are made up from the latest report issued before the compilation of the work, and while in some cases this may include three or four months of 1874, others may well be a full year older. So though we shall speak of the results as for the year 1873, it will be because that is the nearest year, and not because the figures belong to it strictly in all cases.

Turning now to the figures given in the introduction, we present the most important ones below:

	1873.	1872.	Increase.	Per cent.
Length reported....	66,237	57,323	8,914	15.55
Aggregate cost.....	\$3,784,543.034	\$3,169,423,037	\$625,119,977	19.46
Capital stock.....	1,847,638,884	1,647,814,113	299,794,471	18.19
Debt, chiefly funded.....	1,836,904,450	1,611,578,944	225,325,506	14.02
Percentage of debt to total capital.....	48.50	47.85		
Average cost per mile.....	\$57.134	\$55.116	\$2.018	3.66
Gross earnings.....	\$26,419,635	\$26,241,085	\$178,550	0.68
Gross earnings per mile.....	7.948	8.254	Dec. 308	3.73
Freight earnings.....	289,036,508	335,931,785	53,103,723	18.61
Passenger earnings.....	137,384,427	132,290,370	5,175,057	3.91
Working expenses.....	342,609,573	307,496,682	35,122,891	11.42
Proportion of work's expenses to receipts.....	65.1	65.0		
Net earnings.....	189,810,262	160,754,371	29,055,890	18.14
Proportion of gross receipts to cost.....	13.91	15.00		
Proportion of net earnings to cost.....	4.86	5.20		
Average dividend on stock.....	3.45	3.91		
Amounts divided.....	\$7,120,700	\$4,418,151	\$2,702,558	62.30

The progress shown here is an increase of 15.55 per cent. in the mileage reported and 19.4 per cent in the capital invested, of 12.42 per cent. in the gross and 14.34 in the net earnings, and a decrease of net earnings from 5.2 to 4.85 per cent on the capital account, and from 3.91 to 3.45 per cent. in the annual dividend, and a decrease in gross receipts per mile of 3.73 per cent., and of net earnings per mile of 4 per cent. (from \$2,890 to \$2,275.)

The mileage and average cost and earnings per mile in different sections of the country are reported as follows:

	Mileage.	Cost per mile.	Earnings per mile.
New England States.....	5,303	\$48,882	\$9.745
Middle States.....	12,441	90,186	15.628
Western States.....	32,973	52,490	6.421
Southern States.....	13,908	36,772	4.880
Pacific States.....	1,622	95,000	9.418

In this division of States Maryland, the District of Columbia and West Virginia are included with the four others more commonly called Middle States, the Western States begin with Ohio and extend so as to include all the territories having railroads except Washington, and as far south as the Ohio River and to include Missouri and Kansas. The Pacific States are those reaching the Pacific, together with Nevada, and the others are the Southern States.

The amount divided among stockholders was, we have seen, equivalent to 3.45 per cent on the total stock. It will be an error, however, to conclude that the aggregate excess of net earnings over the aggregate interest charges was sufficient to pay such a dividend. No account is taken of the failures to pay interest. If all the railroads of the United States were one property and pledged for the interest and principal of all the railroad bonds, a very considerable portion of the \$67,100,000 paid in dividends would have been required to pay interest which, under the actual circumstances, remained unpaid. If we assume the average rate of interest on the debt to be 7 per cent. (and it is probably more than that in currency), the amount divisible would be only about \$55,000,000, and if it is 8 per cent., as a very large proportion of it is, the amount applicable for dividends would be reduced to \$37,000,000.

Examining the dividend payments with regard to their effect on the rates of transportation, we find that they formed just 12.75 per cent. of the total receipts, and that, therefore, the charges for carrying freight and passengers in the United States during the year under consideration might have been one-eighth less had no dividends been paid.

A statement of the averages per mile will perhaps enable the reader to comprehend more clearly the average condition of our railroads:

	1873.	1872.
Capital invested.....	\$57,184	\$55,116
Stock.....	29,402	28,743
Debt.....	27,782	26,373
Gross receipts.....	7,948	8,254
Working expenses.....	5,174	5,366
Net earnings.....	2,775	2,890
Average dividend per mile.....	1.013	1.124
Proportion of working expenses.....	65.1 p. c.	65.0 p. c.
Proportion of net earnings to capital.....	4.85	5.20
Average rate of dividend.....	3.45	3.91

The progress backward is perhaps sufficiently explained by the large proportion of new railroads whose traffic had begun to develop. But, on the other hand, this was by no means an unprecedented condition, for two or three years before there had been similar additions, and the rapid growth in the earnings of some of these ought partly to overcome the depressing effect of the large proportion of still younger ones. The year was for about three-fourths of its months a very prosperous one, and for the other fourth quite the contrary with many roads. There was in it, probably, considerably more traffic than ever before, and much more than there will be this year; and the increase of 12.42 per cent. in earnings probably does not equal the increase in the traffic, though of that we cannot be sure, as the returns of traffic are too imperfect to afford any trustworthy data. But on most of the more important roads there was a slight reduction in the average rates, as there is almost every year when traffic increases; but this may have been counterbalanced by the comparatively high rates which most new railroads are compelled to charge.

The Annual Convention of the American Society of Civil Engineers.

On another page we give a very brief report of the proceedings of this convention, and of the diversions which followed it. The attendance was, we believe, greater than

## RAILROAD EARNINGS, MAY, 1874.

Name of Road.	Mileage.					Earnings.					Earnings per mile.				
	1874.	1873.	Inc.	Dec.	Per c.	1874.	1873.	Inc.	Dec.	Per c.	1874.	1873.	Inc.	Dec.	Per c.
Atlantic & Great Western.....	571	539	32	.....	6	\$ 430,018	\$ 428,523	\$ 1,495	.....	0%	\$ 758	\$ 795	20%	248	248
Burlington, Cedar Rapids & Minnesota.....	424	334	90	.....	27	86,849	83,683	3,166	.....	3%	205	250	20%	248	248
Central Pacific.....	1,318	1,218	100	.....	8%	1,360,000	1,373,675	13,675	.....	1%	1,117	1,128	1%	1,117	1,128
Chicago & Northwestern.....	1,430	1,404	26	.....	1%	1,272,393	1,256,072	16,321	.....	1%	890	895	5%	890	895
Chicago, Milwaukee & St. Paul.....	1,326	1,330	4	.....	0%	964,800	965,802	1,002	.....	0%	754	764	1%	754	764
Cleveland, Columbus, C. & Ind.....	470	470	.....	.....	.....	306,776	429,920	123,143	.....	39%	653	913	39%	653	913
Illinois Central.....	1,109	1,109	.....	.....	.....	647,592	635,459	12,133	.....	2%	584	573	2%	584	573
Indianapolis, Bloomington & W'n.....	344	319	25	.....	7%	119,910	133,758	13,848	.....	10%	348	416	19%	348	416
Kansas Pacific.....	701	672	29	.....	4%	316,647	329,769	13,122	.....	4%	416	496	19%	416	496
Missouri, Kansas & Texas.....	784	641	143	.....	22%	224,000	250,935	26,935	.....	10%	286	391	37%	286	391
Ohio & Mississippi.....	393	393	.....	.....	.....	309,975	307,520	2,455	.....	0%	784	784	0%	784	784
St. Louis, Alton & Terre H., main line.....	266	266	.....	.....	.....	80,375	118,422	38,047	.....	47%	302	445	47%	302	445
St. Louis, Alton & Terre H., branches.....	71	71	.....	.....	.....	40,801	51,790	10,989	.....	21%	575	730	27%	575	730
St. Louis & Iron Mountain.....	310	299	11	.....	3%	244,894	255,377	10,483	.....	4%	788	853	8%	788	853
St. Louis & Southeastern.....	349	349	.....	.....	.....	88,558	119,157	30,599	.....	34%	252	341	35%	252	341
Toledo, Peoria & Warsaw.....	237	237	.....	.....	.....	493,346	197,135	296,211	.....	149%	208	823	296%	208	823
Toledo, Wabash & Western.....	628	628	.....	.....	.....	420,710	470,598	49,888	.....	12%	670	749	12%	670	749
Totals.....	10,601	10,175	426	.....	4%	\$6,977,555	\$7,188,194	\$210,639	.....	3%	\$656	\$704	7%	\$656	\$704
Total decrease.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

## RAILROAD EARNINGS, FIVE MONTHS ENDING MAY 31.

NAME OF ROAD.	Mileage.					Earnings.					Earnings per mile.				
	1874.	1873.	Inc.	Dec.	Per c.	1874.	1873.	Inc.	Dec.	Per c.	1874.	1873.	Inc.	Dec.	Per c.
Atlantic & Great Western.....	571	539	32	.....	6	\$2,068,785	\$2,019,091	\$49,694	.....	2%	\$3,618	\$3,633	1%	\$3,618	\$3,633
Burlington, Cedar Rapids & Minn.....	424	334	90	.....	27	449,072	385,111	\$63,961	.....	16%	1,059	1,153	8%	1,059	1,153
Central Pacific.....	1,318	1,218	100	.....	8%	5,527,926	5,024,206	503,720	.....	10%	4,127	4,125	0%	4,127	4,125
Chicago & Northwestern.....	1,430	1,404	26	.....	1%	5,283,516	4,775,070	508,446	.....	10%	3,695	3,401	8%	3,695	3,401
Chicago, Milwaukee & St. Paul.....	1,326	1,330	4	.....	0%	3,695,045	2,693,778	1,001,267	.....	38%	2,909	2,308	26%	2,909	2,308
Cleveland, Col. C. & Ind.....	470	470	.....	.....	.....	1,624,938	2,088,097	463,159	.....	28%	3,457	4,336	19%	3,457	4,336
Erie.....	971	971	.....	.....	.....	7,301,970	7,795,315	493,345	.....	6%	7,529	8,028	6%	7,529	8,028
Illinois Central.....	1,109	1,109	.....	.....	.....	2,914,372	3,049,800	135,428	.....	5%	2,628	2,750	4%	2,628	2,750
Indianapolis, Bloomington & W'n.....	344	319	25	.....	7%	692,357	861,140	168,783	.....	19%	2,011	1,759	14%	2,011	1,759
Kansas Pacific.....	701	672	29	.....	4%	1,203,942	1,351,121	147,179	.....	11%	1,681	1,981	18%	1,681	1,981
Missouri, Kansas & Texas.....	784	641	143	.....	22%	1,179,580	1,191,557	11,977	.....	1%	1,508	1,609	7%	1,508	1,609
Ohio & Mississippi.....	393	393	.....	.....	.....	1,972,071	1,560,188	411,883	.....	26%	4,931	3,970	24%	4,931	3,970
St. Louis, Alton & T. H. Main Line.....	266	266	.....	.....	.....	477,083	582,145	105,062	.....	18%	1,794	2,180	22%	1,794	2,180
St. Louis, Alton & T. H. Branches.....	71	71	.....	.....	.....	202,778	246,981	44,203	.....	17%	2,856	3,479	22%	2,856	3,479
St. Louis & Iron Mountain.....	310	299	11	.....	3%	881,005	985,241	104,236	.....	10%	2,841	3,400	20%	2,841	3,400
St. Louis & Southeastern.....	349	349	.....	.....	.....	501,873	531,919	30,046	.....	6%	1,438	1,495	4%	1,438	1,495
Toledo, Peoria & Warsaw.....	237	237	.....	.....	.....	465,085	456,835	8,250	.....	2%	1,902	1,938	2%	1,902	1,938
Toledo, Wabash & Western.....	628	628	.....	.....	.....	2,088,787	2,163,826	75,039	.....	3%	3,336	3,446	3%	3,336	3,446
Totals.....	11,572	11,077	495	.....	4%	\$7,260,105	\$7,331,320	\$71,215	.....	1%	\$623	\$657	5%	\$623	\$657
Total decrease.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

at any previous meeting, and the proceedings if not of more were at least of equal interest to that which has been manifested at the previous annual conventions. One marked peculiarity of this year was the report of several special committees appointed to investigate specific subjects, and the two excellent reports which were read have demonstrated the practicability of collecting information in that way. It was quite obvious that members appointed by the Society to do a certain definite thing would give an amount of time and attention to the investigation and study of such subjects which they would never think of devoting to such work if they were not thus called upon. There are, of course, a great many subjects which should properly come under the cognizance of the engineering profession, and which sadly need investigation. There is enough such work to employ all the available time and energies of the Society if some one will only take the trouble to direct the attention of the members to the right points. This method of doing business and searching for information has worked very well in kindred societies, and in fact, where the aid of circulars of inquiry has been employed, as it was by the "Rail Committee," not the least advantage resulting from this system is the fact that it becomes some one's business to ask just those questions which should be asked, and which persons actively engaged in their occupation and conducting such work should not only ask themselves, but should be able to answer. In fact, the preparation of a series of questions the answers to which will reveal most effectually the knowledge that is sought is often not the least difficult part of a committee's duties, and we feel sure that those who receive such circulars often find themselves for the first time in need of information which they never felt the want of before. We trust, therefore, that this system will be more fully developed, and that it will in future be one of the recognized methods of conducting business by the Society.

The admirable report of the committee appointed to investigate the cause of the late lamentable calamity caused by the breaking of the Williamsburg dam, although the information embodied in it was not procured as the resolution appointing the "Rail Committee" specified, that is, "by means of a circular of enquiry," yet was the result of a request by the Society to some of its members to procure certain definite information which the whole public, as well as the members of the profession, wanted very much to obtain from some persons competent to form an opinion from the facts as they existed. This information was very admirably presented by the committee appointed for the purpose.

Besides the reports referred to, there were a number of very excellent papers presented and read, of which we are not able now to speak, but which were of great interest and value. There was, therefore, no lack of material out of which to construct a meeting, and to serve as the frame-work for a great deal of discussion. Unfortunately there was comparatively little time for this. The Conven-

tion assembled at 11 a. m., and was in session until 5 p. m., with an intermission of about half an hour. The evening session was from 8 to 10½ p. m., so that altogether about eight hours were devoted to the annual convention. One of the reports was very long and occupied one-fourth of this time in reading. Besides these there were ten papers read which consumed about one-half of the remaining time, so that there were only a few hours for discussion. It is hardly necessary to say that it was simply impossible to do justice to the subjects presented in this time. Besides the papers which were read, about a half-dozen were left in the hands of the Secretary which there was not time to read. It was therefore quite obvious that the Annual Convention this year was suffering from congestion, and that either there must be fewer papers or more time hereafter. In fact, the reading of many of the papers is simply a waste of time. A report, for example, full of statistics or calculations is simply incomprehensible to persons who hear it read. The consequence is, the hearers grow weary, lose their interest, and finally either leave the meeting, or wish they could, and the next year are inclined to stay away, or are sorry they did not if they do come. Certainly some more effective way could be devised to draw out discussion and thus elicit the opinions, experience and knowledge of the members, than to get them together and read to them until they are too weary to take any further interest in what is done. It is, therefore, not surprising that there is a growing sentiment in favor of printing reports and papers which are to come up for consideration and discussion, and thus dispense with the reading of them. A discussion with the printed document before each member for reference would certainly be a more intelligent way of deliberating on an abstract subject than depending upon the fugitive impressions which remain after the reading is finished.

It is also difficult to see why these annual meetings should be confined to one day. Nearly all the members who attend are obliged to devote a week to the work or play, whichever it is. Now to be in session during eight hours of one day is much more fatiguing than to be occupied in a similar way for four or five hours each day for three days. In the one case there is much more time, and the members would be in much better condition for intelligent discussion during that time than they would be if their attention was overtaxed. At the annual meetings of the Master Mechanics' Association the sessions begin at 9 a. m., and last until 2 p. m. with one or two short intermissions. In the afternoon and evening there is usually some diversion, or places of interest to visit, so that there is a very agreeable admixture of work and play. The civil engineers might follow their example profitably, we believe.

We do not of course wish to underrate the merely social features of these meetings, which are quite as important and probably more profitable in many ways than the proceedings conducted under the shadow of parliamentary law; but should the former usurp the place of the latter, it



will not be long before many will conclude that the fun does not pay for the time and money which it costs, and therefore the two features of the meetings should be made mutually dependent upon each other.

There was an interesting visit to Hoboken and to the Stevens Institute and the celebrated "Stevens Ram," which to those of our readers who do not know (and doubtless there are many who are ignorant) we may explain to be not a sheep nor a hydrostatic machine, but a war ship, the construction of which was commenced by the founder of the Stevens Institute many years ago and which is still unfinished. The excursion in the harbor and to the East River Bridge, Hell Gate and the Fourth Avenue Improvement was extremely interesting and agreeable, as the roomy ferry boat gave every facility for social intercourse and for seeing what was to be seen. The annual dinner, as a dinner, that is victuals and drink, was generally anathematized. It was held or served or celebrated, whichever is the right word, in a sub-way of the Tammany Hall building. The ceiling of the apartment was not over—at a rough guess—12 feet high. In this room a loud brass band enlivened the assemblage with music which, whether it was "the music of the future" we cannot say, but it certainly was loud enough for the future to hear. But the music and the viands to the contrary, the occasion was a pleasant one, and it is only to be regretted that some of the very excellent material out of which future history could be made which was contributed by some of the speakers could not be preserved in some enduring form.

Of the excursion to the anthracite coal regions of Pennsylvania we can only speak by hearsay. It was, we learn, admirably arranged, and everything, it is said, seemed to occur spontaneously at the right time. For this the members were indebted to the committee and to Mr. Ricker, of the Central Railroad. Some extraordinary time is reported to us in the run from Bethlehem to New York, but as we have not accurate data regarding it we will not report it here.

Altogether the Convention was voted a success.

#### The French Railroads in 1873.

The summary of the receipts of the French system of railroads for the year 1873 has just been published.

The total length of the railroads worked in France at the close of 1873, was 11,061 miles. During 1873 450 miles were opened, and the mileage worked rose to 11,511. Of the new roads 40 miles belongs to the "old system" of the "six great companies," and 195 miles to the "new system" of these companies, or 235 miles in all. The other companies, called in France the "small companies," constructed 215 miles, almost as much as the six "great" ones, though at the beginning of the year the latter had 10,550 miles in operation, and the former only 511, while the great companies cover the whole of France, leaving only here and there a corner of the country for the little ones.

France having 36,000,000 of inhabitants, there were at the close of 1873 3,127 people to each mile of railroad (not including roads of purely local interest, such as the roads of mines and manufactories). There was also one mile of railroad to 6.8 square miles of surface.

The most productive part of these railroads is the "old system" of the six great companies, which included 5,793 miles of road, with average gross receipts of \$20,940 (gold) per mile, equivalent to \$23,555 in our currency. Working expenses in France being usually not more than 50 per cent., this would give a net income of 10 per cent. on a capital cost of nearly \$120,000 per mile. The new system is much less productive, its average gross earnings having been but \$6,520 per mile. The "small companies" have still lower receipts, the average being only \$3,502 per mile, which is as low as the earnings of any new American railroads that return the interest on their bonds. These lines in France, however, are in large part incomplete, and not expected to return full earnings until completed. They are similar in character to the new system of the six great companies, which has a much smaller proportion of unfinished lines.

Alongside of exceptional cases like that of the line from Bomain to Anzin, which runs a length of 12 miles, and returns annual earnings of \$22,320 per mile, there are lines in course of construction whose product does not reach gross receipts of \$1,500 per mile.

Altogether, the entire French system yielded \$13,640 per mile in 1873.

#### The Reports of Earnings.

The number of roads reporting earnings, as our table shows, has grown smaller, as is usually the case when earnings grow smaller, many corporations, like most persons, liking better to display their property than the opposite condition. The seventeen roads whose May earnings are given in our table with an increase of 4½ per cent. in mileage, show a decrease of 2½ per cent. in earnings, and an average decrease of 7 per cent. in earnings per mile—from \$704 to \$659. Only two roads of the seventeen show an increase in earnings per mile.

From the five months ending with May, the roads reporting, having an increase of 4½ per cent. in length, show a decrease of 5-16 of 1 per cent. in earnings, and of 4½ per cent. in earnings per mile—from \$3,375 to \$3,221.

#### Record of the New Railroad Construction.

This number of the RAILROAD GAZETTE has information of the laying of track on new railroads, as follows:

Baltimore Pittsburgh & Chicago.—Extended westward 6

miles to Defiance, Ohio. Wisconsin Valley.—Extended northward 12 miles from the crossing of the Wisconsin Central to Knowlton, Wis. Palisade & Eureka.—Completed from the Central Pacific at Palisade, Nev., southward 10 miles.

This is a total of 28 miles of new railroad, making 537 miles completed in the United States in 1874.

#### NEW PUBLICATIONS.

*Snow's Pathfinder Railroad Guide* with the number for June closes its twenty-fifth year of existence, and in that number gives some interesting comparisons between the railroads of New England at that and the present time, with some personal reminiscences of the superintendents in service in 1849, of whom only one, Mr. A. S. Mathews of the Stonington & Providence, still retains the position then held by him. The *Pathfinder* is carefully edited, correct and generally trustworthy, and covers very completely the field to which it confines itself, the railroads of New England and the Maritime Provinces. Its time-tables are official and changes are promptly noted.

#### Contributions.

##### Courtesy a Requirement.

KANSAS CITY, June 9, 1874.

TO THE EDITOR OF THE RAILROAD GAZETTE:

This morning, while being rapidly borne up the Valley of the Missouri to this would-be entrepot of the Great West, I divided my attention, giving part to the Big Muddy and its verdant fringe and part to the fifth annual report of the Massachusetts Commissioners. As we crossed the bridge that reminded me of the unassuming exterior embedding the solid worth and intellect of its engineer, O. Chanute, I closed the volume I had been perusing at page 116, wherein is inscribed the homely administered to the railroad companies of Massachusetts on the subject of social amenities and the somewhat pathetic lament of the Commissioners that, "It is perhaps not within the power of this Board to effect reforms as regards politeness and courtesy in the dealings of railroad officials with the travelling public." The words I had perused awoke recollections of unpleasant personal experiences on the New York Central in days gone by, and the well-earned reputation of that road, which exists to the present day, for uncouth treatment of its customers by its employees. The train of ideas thus started naturally ran into an analysis of the chain of sympathies by which the character of the head of a body of men impresses itself on all the members. "Like master, like man," is an old, evergreen adage, with its roots deep in the perennial stream of human nature. Thus deeply pondering, I entered the gentlemen's waiting-room of the Union Depot, when, raising my eyes, they were instantly attracted by a framed notice, with a big "READ THIS" at the head and the name of B. S. HENNING at the bottom. Here was an antidote for my condition; for who can think of the rotund figure and genial countenance of the gallant Major without feeling that after all there is some good in human nature, some milk of human kindness, and that it is not all vinegar and water. I give the notice entire, hoping somebody else may be moved to go and do likewise:

##### "READ THIS."

"The rules published below are taken from the rules and regulations of this railroad as published on each time-card, and any person having just cause of complaint against any employee of the Missouri River, Fort Scott & Gulf Railroad Company is requested to forward the same in writing to the Superintendent at Kansas City with as full particulars as possible, and it will in every case be fully investigated and acted upon:

"RULE No. 25.—Train and station baggage-masters are particularly cautioned against careless handling of baggage. Heavy trunks are not to be smashed. Passengers will be permitted to carry as much and as heavy baggage as they choose, the company reserving the right to charge extra for all over 100 lbs. per passenger at express rates. Conductors will give sufficient time to receive, transfer or discharge baggage with proper care; and in case baggage should be injured through carelessness of baggage-masters, the conductors are authorized to settle with owners for damage to trunks, allowing reasonable damages, taking receipt for amount paid, and report same to Superintendent's office, in order that the amount so paid may be stopped from the pay of the baggage-master.

"RULE No. 35.—Be always careful. In cases of doubt or uncertainty take the safe side without hesitation. Let every man protect his own train and engine, each section man and station agent his track and switches, and accidents from carelessness will never occur.

"RULE No. 36.—The popularity and prosperity of the road depend greatly upon the manner in which its patrons are treated by its employees. Strict propriety of conduct and the avoidance of provoking and indecent language in the transaction of business with others or with one another are required. Every person employed upon the road is expected to be courteous to all, to answer all questions civilly, to make passengers as comfortable as circumstances will permit, and to bear in mind that no provocation will justify rudeness or incivility towards them.

"B. S. HENNING, Superintendent."

Comment would but tarnish the brightness of these golden rules. Let them be graven on tablets of stone!

I cannot close this communication from this neutral ground of barbarism and civilization, without mentioning the fact that the Union Depot here is remarkably well managed and arranged. Compared with the Chicago Union Depot, it is a palace with Baron Haussman for Lord Chamberlain. Cleanliness and neatness please the eye; civility of uniformed officials gratifies the heart; multifarious time-pieces with lucid time-tables and instructions comfort the suspicions of the traveller in search of his train. There are yet too many display-cards disfiguring the interior of the conveniently arranged waiting-rooms and serving no good purpose, but the magnificent Beebe's patent show-case on the platform is an ornament,

and, showing as it does the time of day and the times of arrivals and departures, can be tolerated as useful.

OH MY HAW!

## General Railroad News.

### ELECTIONS AND APPOINTMENTS.

—The directors of the East River Bridge Company have chosen the following officers: President, Jeremiah P. Robinson; Treasurer, James H. Prentice; Secretary, O. P. Quintard; Executive Committee, Messrs. Stranahan, Kingsley, Vance and Stewart; Finance Committee, Messrs. Schroeder, Wheeler and Andrew H. Green.

—The directors elected (to serve for three years) at the annual meeting of the St. Louis, Alton & Terre Haute Railroad Company in St. Louis, June 1, were Anthony Thornton, Levi Davis, M. M. Dills and George W. Parker. The board elected Charles Butler President; George W. Parker, Vice-President and Treasurer; E. F. Leonard, Secretary; W. G. Broughton, General Superintendent; A. T. Nash, Auditor. Mr. Butler, however, subsequently resigned, and Robert Bayard, of New York, was elected in his place.

—At the annual meeting of the Burlington, Cedar Rapids & Minnesota Railroad Company in Cedar Rapids, Ia., June 4, the following directors were elected: George Greene, John F. Ely, S. L. Dows, D. W. C. Rowley, W. W. Walker, J. L. Bever, A. S. Belt, William Greene, J. W. Traer, Cedar Rapids, Ia.; FitzHenry Warren, J. W. Barnes, T. W. Barbydt, Burlington, Ia.; Henry Clews, New York. The board subsequently elected officers as follows: President, George Greene; Vice-President and General Manager, William Greene; Treasurer, Dr. John F. Ely; Assistant Treasurer, H. B. Stibbs; Secretary, D. W. C. Rowley; General Superintendent, W. W. Walker; Auditor, J. C. Brookamit; General Agent, J. W. Traer; General Solicitor, A. S. Belt.

—The annual meeting of the Chicago, Milwaukee & St. Paul Railway Company was held in Milwaukee, Wis., June 13, and Alexander Mitchell, Russell Sage, Selah Chamberlain and Julius Wadsworth, the four directors whose terms expired, were re-elected. The board re-elected the old officers, as follows: President, Alexander Mitchell; Vice-President, Russell Sage; General Manager, S. S. Merrill; Assistant General Manager, John C. Gault.

—At the annual meeting of the Chicago & Southwestern Railway Company at the Missouri end of the Leavenworth Bridge, the following directors (one-third of the board) were re-elected to serve three years: J. W. Downey, Rock Island, Ill.; Thomas F. Withrow, Chicago, Ill.; Wm. L. Scott, Erie, Pa.; David Lows, New York.

—At the annual meeting of the Peoria, Pekin & Jacksonville Railroad Company, held in Pekin, Ill., June 11, John Allen, Lucius Hopkins, Richard Arnold, James M. Constable, James F. Kelsey and Lebbeus Chapman, Jr., were elected directors for the ensuing year. At a subsequent meeting of the directors, John Allen was re-elected President of the company.

—At the annual meeting of the Cumberland & Ohio Railroad Company in Louisville, Ky., June 10, the following directors were elected: J. J. Turner, T. Manion, E. H. Hobson, R. S. Montaigne, N. S. Ray, James Spaulding, J. R. Hughes, W. H. Dulaney, S. R. Norman, A. B. Veech, Gideon King, W. M. Winlock, J. H. Lewis, J. A. Middleton, John T. Moore.

—The new board of directors of the Baltimore & Potomac Railroad Company has re-elected the old officers as follows: Hon. Oden Bowie, President; J. N. Du Barry, Vice-President and General Manager; Stephen Little, Secretary and Auditor; John S. Leib, Treasurer.

—At a meeting of the Lake Simcoe Junction Railway Company in Toronto, Ont., June 4, a permanent organization was effected by the election of the following directors: R. McCormick, J. R. Bouchier, James Anderson, Edmund Shuttleworth, W. Summerfelt, Robert Royland, N. Graham, Allen Graham, J. N. Blake. At a subsequent meeting of the board J. N. Blake was elected President and R. McCormick Vice-President.

—Mr. John U. Parsons having resigned his position as General Ticket Agent of the Toledo, Wabash & Western Railway, the Passenger and Ticket Departments have been consolidated and placed under the charge of Mr. W. L. Malcolm, General Passenger Agent, to whom all communications pertaining to either department should be addressed.

—The annual meeting of the Wisconsin Central Railroad Company was held in Menasha, Wis., June 4, and the following directors were elected: Gardiner Colby, A. H. Abbott, Charles L. Colby, and A. J. Banyon, Boston, Mass.; George Reed, M. Wadleigh, of Wisconsin; E. B. Phillips, Chicago; E. Barney, Dayton, O. The board subsequently elected Gardiner Colby, President; George Reed, Vice-President; A. H. Abbott, Secretary and Treasurer. Judge Reed afterwards declined to serve longer as Vice-President, and Mr. Charles L. Colby was elected to that office.

—At the annual meeting of the Genesee Valley Railroad Company in Rochester, N. Y., June 11, the following directors were chosen: Jerome E. Butterfield, D. B. Morse, L. Ward, William N. Sage, C. E. Upton. The board subsequently elected officers as follows: President, James Brackett; Vice-President, D. B. Barton; Secretary and Treasurer, C. E. Upton.

—At the annual meeting of the Chicago & Northern Pacific Air Line Railroad Company in Chicago, June 12, Anson Stager, W. H. Conger and C. W. Cook, were chosen directors for three years.

—At the annual meeting of the New Haven & New London Railroad Company in New Haven, Conn., June 9, the stockholders elected the following board of directors: S. B. Chittenden, Edward Ingraham, James M. Townsend, Charles G. Langdon, E. H. Trowbridge, Henry L. Hotchkiss and Wilbur F. Day. At a meeting of the directors, held subsequently, the following officers were chosen: President, S. B. Chittenden; Vice-President, James M. Townsend; Secretary, Treasurer and Transfer Agent, Wilbur F. Day. The road is leased to the New York, New Haven, & Hartford.

—At the annual meeting of the Peoria & Bureau Valley Railroad Company in Chicago, June 11, David Dows, Charles W. Durant, John F. Tracy, Frederick C. Durant, Francis H. Tows, William F. Durant and William R. Travers, were elected directors for the ensuing year. The road is leased to the Chicago, Rock Island & Pacific Company.

—At the annual meeting of the Winona & Southwestern Railway Company in Winona, Minn., June 8, H. W. Lamberton, E. S. Youmans, Wm. Mitchell and Charles Horton were elected directors to serve three years. The board elected Wm. Mitchell, President; E. S. Youmans, Vice-President; Thomas Simpson, Secretary; M. G. Norton, Treasurer.

—The directors of the newly organized New River Railroad Company are J. D. Sergeant, Elbert S. Fowler, Gen. G. C. Wharton, J. T. Cowan, Jed Hotchkiss, Harvey Beckwith, Thomas Graham. The board elected J. D. Sergeant, Philadelphia, Pa., President; Charles W. Stratham, Treasurer pro tem.

—The New Hampshire Legislature has chosen Alvah W. Sully, of Franklin, Railroad Commissioner for the ensuing year.



—The Worcester County Central Railroad Company has been organized with the following officers: President, Richard Sugden, Spencer, Mass.; Vice-President and General Manager, John Gilman, East Brookfield, Mass.; Clerk, Josiah W. Temple, Spencer, Mass.; Treasurer, Edward Sargeant, Leicester, Mass.; Executive Committee, Richard Sugden, Dr. E. M. Wheeler, Spencer, Mass.; John Gilman, W. G. Fay, East Brookfield, Mass.; E. S. Watson, Leicester, Mass.; F. W. Wellington, Worcester, Mass.; Alden Batcheller, New Bedford, Mass.

—William P. Iams has been appointed Paymaster and Cashier of the Logansport, Crawfordsville & Southwestern Railroad, with office at Terre Haute, Ind.

—Prof. J. Peter Lesley, of the University of Pennsylvania, and also Editor of the *United States Railroad and Mining Register*, a gentleman especially eminent in geology and topography, but also singularly accomplished in many directions, has been chosen State Geologist of Pennsylvania.

—Mr. G. Thomas Hall, C. E., member of the American Society of Civil Engineers, has been appointed Assistant Engineer on the New York State Canals, in charge of the Enlargement of the Champlain Canal at Whitehall. Mr. Hall has been engaged for some time past on the West Troy Water Works under Division Engineer D. M. Greene, also a member of the Society of Civil Engineers.

—Mr. Phil. J. Scholt has been appointed Superintendent of the Louisville & Portland Canal.

—Mr. H. B. Latrobe, late Superintendent of the Chicago Division of the Pullman Palace Car Company, has been appointed General Superintendent of the Pullman Southern Car Company, with office at Louisville, Ky.

—Mr. E. A. Jewett has been appointed Superintendent of the Chicago Division of the Pullman Palace Car Company in place of H. B. Latrobe.

—In the list of officers of the Marietta, Pittsburgh & Cleveland Railway given last week one name was inadvertently omitted, that of Mr. H. P. Kingsbury, Assistant General Freight and Ticket Agent.

—Mr. Oliver Hoblitzell has been appointed General Agent and Mr. J. L. Morrow Train Dispatcher of the Baltimore & Ohio Railroad Company at the Camden Station, Baltimore.

—At the annual meeting of the Syracuse Northern Railroad Company in Syracuse, N. Y., recently the old board of directors was re-elected, as follows: Jas. J. Belden, Allen Monroe, Wm. H. Carter, James A. Clark, Orin B. Earle, Frank Hancock, Jacob S. Smith, Lucius Gleason, Thomas Gale, Wm. T. Hamilton.

—Mr. George W. Cushing, Superintendent of Machinery of the Toledo, Wabash & Western Railway, having resigned, the Machinery Department will hereafter be in charge of the following gentlemen: James B. Morse, Master Mechanic Eastern Division, Fort Wayne, Ind.; Jacob Johann, Master Mechanic Western Division, Springfield, Ill.; U. H. Kohler, Master Car Builder, Toledo, O.

—Mr. T. C. Spooner has been appointed Contracting Agent in St. Louis for the St. Louis & Southeastern Railway, to succeed C. N. Parry.

—At the annual meeting of the Santa Cruz Railway Company in Santa Cruz, Cal., June 2, the old board of directors was re-elected, as follows: Claus Spreckles, Christopher Nelson, Benjamin F. Porter, D. Tuthill, F. A. Hihn, Titus Hale, J. N. Besse.

## PERSONAL.

—Mr. George S. Harris, Land Commissioner of the Burlington & Missouri River Railroad in Nebraska, died at his residence in Lincoln, Neb., June 12. Mr. Harris was a native of New York, was a merchant in Boston till 1864, when he was appointed Land Commissioner of the Hannibal & St. Joseph, which he held till 1870, when he accepted the same office from the Burlington & Missouri River, the Iowa company. He went to Nebraska in 1872.

—Mr. George W. Cushing, formerly Superintendent of Machinery on the Northern Pacific, and for some time past Superintendent of Machinery on the Toledo, Wabash & Western Railway, resigned his position June 15. No successor is appointed, the office being abolished.

—Mr. Richard Norris, who with his brother William in 1839 laid the foundation in Philadelphia of the Norris Locomotive Works, for many years one of the principal manufacturers of locomotives in this country, whose work is still to be found on many of our railroads, died at his residence at Chestnut Hill, Pa., on the night of the 3d of June. The manufacture was given up in 1865, when the works had a capacity of about 150 locomotives yearly and the investment was at least a million of dollars. Mr. Norris had accumulated a fortune estimated at a million and a half at the time of his death. He was a native of Baltimore and was at one time a druggist there, and came to Philadelphia when his works were begun, in 1835. His brother William survives him.

—Of the three new members of the New York Central & Hudson River board, Mr. Chauncey M. Depew, who succeeds Solomon Drullard, is a lawyer and public speaker of some note, and was for some years the New York attorney for the company. In 1873 he was the unsuccessful candidate for Lieutenant Governor of New York. Mr. William K. Vanderbilt, who succeeds Jas. H. Banker, is a son of William H. Vanderbilt, the Vice-President and General Manager, and a grandson of Cornelius Vanderbilt, the President of the company. Mr. Walter S. Church was a warm friend and associate of the late Horace F. Clark, whom he succeeds. The last board had two sons-in-law (Clark and Banker) and one son of the President of the board; this one has only the son and grandson, and it seems hardly so much of a family affair as it used to be.

—Mr. Asa Whitney, the head of the firm of Whitney & Sons, Philadelphia, manufacturers of car-wheels, and one of the oldest and ablest of American manufacturers of railroad material, died in Philadelphia June 4, in his 83d year. Mr. Whitney was born in Massachusetts, learned the blacksmith's trade of his father, went into a machine shop in Keene, N. H., where he attained such skill that he was sent to New York to erect cotton machinery; was Assistant Superintendent of the Mohawk & Hudson Railroad from 1831 to 1839; afterwards was Canal Commissioner of the State of New York, and in 1842 went to Philadelphia, where for two years he was a partner of Matthias W. Baldwin, in the manufacture of locomotives. Obtaining an interest in the Morris Canal he was made President, and it was during his administration that steam inclined planes were substituted for locks. It was in 1847 that he began the manufacture of car-wheels, in connection with which he is best known to this generation. His wheels were made by a process which he patented, including the annealing of the wheel. In 1850 he was President of the Philadelphia and Reading Railroad, a position which he soon resigned on account of ill health, and he has never been quite well since.

—It is stated that in all probability Mr. W. D. Bishop, President of the New York, New Haven & Hartford Railroad Company, will soon retire from his position on account of his increasing age and ill-health. The man most prominently spoken of as his successor is Mr. Henry M. Robinson, of Hartford, now attorney for the company.

—Mr. Charles B. Peck, for some time past General Freight and Ticket Agent of the Leavenworth, Lawrence & Galveston

Railroad, and at one time Acting Superintendent also, has resigned his position.

—A great deal has been said recently about the courage and devotion of Jack Evans, a locomotive runner on the Chicago, Burlington & Quincy Railroad, who risked his life by jumping from his engine, which he could not stop quite in time, to pull a little child from the track and who saved its life and was tumbled into the ditch with it by the engine. The report of this draws from a correspondent of the *Chicago Inter-Ocean* an account of a similar case in which the runner not only risked his life but lost a leg in saving a child. This man was William Whitaker, who ran a coal train on the Vandalia Line.

—Mr. Thomas L. Green, for many years Superintendent of the Boston & Albany Railroad, died in Albany June 12 aged 65 years.

## TRAFFIC AND EARNINGS.

—The earnings of the Great Western Railway of Canada for the week ending May 22 were: 1874, \$21,407; 1873, \$25,658; decrease, \$4,251, or 16% per cent.

—The earnings of the Grand Trunk Railway for the week ending May 23 were: 1874, \$38,300; 1873, \$36,800; increase, \$1,500, or 4% per cent.

—The earnings and expenses of the Union Pacific Railroad for April were:

	1874.	1873.	Decrease.	Per cent.
Earnings.....	\$834,954 82	\$881,266 38	\$46,311 86	5%
Expenses.....	453,366 27	471,078 84	17,712 57	3%
Net earnings.....	\$381,588 25	\$410,187 54	\$28,599 29	7%

The expenses in 1874 include \$48,000 for new rails and \$36,000 for taxes. For the four months ending April 30 the report is as follows:

	1874.	1873.	Decrease.	Per cent.
Earnings.....	\$2,750,680 16	\$2,605,281 32	\$145,404 84	5%
Expenses.....	1,555,361 58	1,445,474 56	109,887 02	7%
Net earnings.....	\$1,195,324 58	\$1,159,806 76	\$35,517 82	3-1-16

The expenses were 56.54 per cent. in 1874, and 55.48 per cent. in 1873. The earnings were \$2,665 per mile in 1874, and \$2,524 in 1873.

—The earnings of the Denver & Rio Grande Railway for the fourth week in May were: 1874, \$12,278.53; 1873, \$12,707.18; decrease, \$428.65, or 3% per cent.

—The export clearances for Europe of grain for the four weeks ending with June 11, from New York, Boston, Montreal, Philadelphia and Baltimore, were 162,723 barrels of flour, 7,721,370 bushels of wheat, 2,196,356 of corn and 81,168 of rye.

—For the week ending June 6, the grain receipts at the six lake ports, St. Louis and Peoria were 132,052 barrels of flour, 2,287,777 bushels of wheat, 2,236,813 of corn and 708,509 of oats. This amounts to 15,760 full car-loads.

—The eastward rail shipments of flour and grain from the six lake ports, St. Louis and Peoria for the week ending June 6 amounted to 3,839 full car-loads and to 25% per cent. of the total tonnage shipments for that week.

—The Northern Railroad of France, one of the six great companies, in its report for 1873 shows average gross earnings per mile on its sold system of \$28.593, and working expenses 47.6 per cent. Of the receipts, 64 per cent. was from freight trains, the average per ton per mile being 1.51 cents gold, about equal to 1.7 cents in our currency, which is higher than the average per ton per mile of our roads with heaviest traffic, such as the Pennsylvania, the New York Central, the Erie, the Lake Shore, etc. The Charentes Railroad shows receipts per passenger of 2.3 cents, and per ton of freight 2.62 cents in our currency.

—This season's wheat crop in California is estimated at \$35,000,000, of which probably \$30,000,000 will be available for exportation, a quantity greater than the whole country usually exports, and all of it is exported to foreign countries. Nearly all of it, too, will have to pass over the Central Pacific and Southern Pacific railroads.

Thus the New York receipts were 62 per cent. of the total tonnage.

—The cotton receipts for the nine months ending with May, for two years, at the ports of export, were:

	Nine months ending with May.	
	1874.	1873.
New Orleans.....	1,190,063	1,177,179
Mobile.....	252,628	321,019
Charleston.....	423,668	322,227
Savannah.....	635,144	595,337
Galveston.....	360,511	328,474
New York.....	186,203	135,160
Florida.....	12,881	11,942
North Carolina.....	49,665	53,765
Norfolk.....	475,929	385,990
Other ports.....	46,314	52,635
Totals.....	3,673,006	3,413,128

The total increase is 7.6 per cent. In three cases there is a decrease of receipts. Of those showing an increase, New Orleans gains only 1 per cent., Charleston 20 per cent., Savannah less than 7 per cent., Galveston 10 per cent., New York 37% per cent., Norfolk 23% per cent. There is no change in the relative positions of these ports. Galveston's receipts, 10 per cent. more than for the previous season, were 100 per cent. greater than for the same period ending with May, 1872.

—The anthracite coal tonnage of the lines given (whose year begins December 1) for the six months ending May 30 was as follows:

	1874.	1873.	Inc. or Dec.	P. ct.
Philadelphia & Reading.....	2,671,315	2,615,365	Inc. 55,950	2%
Schuylkill Canal.....	255,087	187,238	Inc. 67,849	36%
Lehigh Valley.....	1,998,880	1,813,181	Inc. 185,699	4%
Pennsylvania & N. Y.....	339,198	298,876	Inc. 40,322	13%
Totals.....	5,164,480	4,912,660	Inc. 251,790	5%

—The bituminous coal traffic over the lines given was as follows for the five months ending May 30:

	1874.	1873.	Inc. or Dec.	P. ct.
Huntington & Broad Top.....	146,720	195,948	Dec. 49,228	25%
Clearfield Coal over Tyrone.....	259,365	215,184	Inc. 44,211	20%
Div. Pennsylvania R. R. (five months).....	111,451	138,582	Dec. 27,131	14%
Totals.....	524,536	550,684	Dec. 26,148	4%

—The earnings of the Denver & Rio Grande Railway for the first week in June were: 1874, \$8,317.60; 1873, \$8,392.70; decrease, \$75.10, or 1% per cent.

—The earnings of the Indianapolis, Bloomington & Western Railway for the first week in June were: 1874, \$34,203; 1873, \$31,999; increase, \$2,204, or 7% per cent.

—The receipts of coal at East St. Louis for the month of May were:

	Cars.	Tons (25 bu.)
Bellefonte & Southern Illinois.....	2,024	24,280
Illinois & St. Louis.....	1,227	15,355
Ohio & Mississippi.....	930	11,160
St. Louis & Southeastern.....	717	8,604
Cairo & St. Louis.....	803	7,144
Totals.....	5,701	68,061

## CHICAGO RAILROAD NEWS.

## A Railroad War.

The Chicago & Pacific Railroad Company's terminus has been on Goose Island, on the North Branch, something more than a mile northwest from the Wells street bridge; but it had all the time intended to have its passenger depot eventually on Chicago Avenue near the river, some distance nearer the center of the city. To this end it needed to lay track for about a mile on Hawthorne Avenue near to and parallel with the North Branch Canal. It secured the necessary city legislation two years ago, but the people on the street being hostile it did not begin the work until midnight on Saturday, when injunctions could not be had to restrain it. Then, in the face of considerable opposition but protected by the police it laid the track hurriedly on the surface of the street the entire distance, and ran an engine over it.

Immediately an attempt was made to lay track for the Chicago & Evanston Company from the northern end of the other work northward, but in this case an enormous crowd, chiefly of women, collected and tore up the track and burned the ties, and Monday morning further work was stopped by an injunction. But early Tuesday morning the injunction was modified so as to permit the company to complete the track to the city limits, provided it should put the street in condition for public use, and refrain from running cars over the road until the suit for injunction was decided. Immediately a force was set at work which completed the track, about 1,500 feet, in 32 minutes. The whole length of this line is about three-quarters of a mile from the junction with the Chicago & Pacific to the north city limits.

## Chicago, Burlington &amp; Quincy.

Having secured the passage of the necessary bill through Congress, this company is about to build a pontoon bridge across the Mississippi at Clinton, Ia. It will be on the same general plan as the Milwaukee & St. Paul pontoon at Prairie du Chien.

## Chicago &amp; Southern.

This company has secured the right of way from the city limits southward through Blue Island to Thornton, a distance of 22 miles. Work will be begun very soon, and it is thought the road can be finished in four months. This is the company which is to build a line into Chicago for the Chicago, Danville & Vincennes.

## Chicago &amp; South Atlantic.

A meeting of the directors was held in Chicago recently. It was stated that the Kentucky Division company is being organized and that work will soon be commenced from London, Ky., southward.

## Chicago &amp; Alton.

The Illinois Supreme Court, now in session at Mt. Vernon, has, on application from this company, granted a writ of *superseas* and an order to stay further proceedings upon the judgment against the company obtained in the Sangamon Circuit Court. This will bring the case before the Supreme Court.

## The Goodrich Steamer Lines.

The Goodrich Transportation Company, which has the principal lines running between Lake Michigan ports, has this year nine vessels running on six different routes, namely:

Chicago & Milwaukee.—Side-wheel steamer Chicago, 760 tons; side-wheeler Sheboygan, 625 tons.

Chicago, St. Joseph, & Benton Harbor.—Side-wheeler Corona, 470 tons.

Chicago, Grand Haven & Muskegon.—Side-wheeler Muskegon, 620 tons; propeller Menomonee, 800 tons; Milwaukee, Sheboygan, Manitowoc, and Escanaba; side-wheeler Alpena, 650 tons.

Milwaukee & Manitowoc.—Propeller Depero, 740 tons.

Chicago & Green Bay.—Propeller Oconto, 805 tons; propeller Truesdell, 500 tons.

No Admission Without Tickets.

The Milwaukee & St. Paul and Chicago & Northwestern Companies have issued orders requiring passengers to purchase tickets before entering the cars. Aside from the general reason for this, to relieve the conductors from the labor (and temptations) of collecting and accounting for money, is the especial one of avoiding trouble with those citizens of Wisconsin who are conscientiously opposed to the violation of the new Wisconsin law limiting charges to three cents a mile. Such persons having once got into the car, sometimes refuse to pay the company's charges, and if the conductor insists that they shall ride no farther than the money they pay will take them at the company's rates, they can make it very unpleasant for him and all the rest of the passengers, especially when there are several of them.

## THE SCRAP HEAP.

## Mr. Thomson's Will.

The will of Mr. J. Edgar Thomson was admitted to probate in Philadelphia June 5. The will appoints two trustees who, after providing for his wife, two sisters, a niece and a nephew, are to appropriate the remainder of the net income of the estate, after the payments specified, or so much of it as may judiciously be applied thereto, to the education and maintenance of the female orphans of railroad employees who may have been killed while in the discharge of their duties. Preference is to be given, first, to the orphans of the employees engaged with the Pennsylvania Railroad; second, to those of the Georgia Railroad, between Augusta and Atlanta; third, to those of the lines controlled by the Pennsylvania Railroad, by lease or otherwise; fourth, to those of employees of any other railroad company of the United States of America.

The estate is valued at \$2,000,000.

## Hauling Large Trains.

A railroad man writes to us from St. Mary's, Pa., on the Philadelphia & Erie Railroad, commenting on a statement made in our issue of May 26 as to the hauling of 102 cars (101 empty) by Engine 950 on the Pennsylvania Railroad and 70 loaded cars back, as follows: "April 24 Engine 1,102 on this line hauled from Emporium a train of 90 loaded, Engine 1,048 80 loaded, Engine 1,127 equivalent to 80 loaded, and Engine 1,041 equivalent to 75 loaded. The distance the trains were hauled was 46 miles." This was after the delay of trains by the burning of the Cameron bridge. On the same day passenger Engine 1,094 hauled 65 loaded cars.

## OLD AND NEW ROADS.

## New York &amp; Eastern.

Much testimony has been taken by the Railroad Committee of the Connecticut Legislature on the application of the company for permission to bridge the Housatonic River. The general drift of the testimony seems to be that the company has not the means to build a good road to compete with the New York, New Haven & Hartford, and that the intention of its projectors had been to sell bonds enough to pay for the road. It depended on two other companies for its line from the Connecticut State line to New York. The stock subscrip-



tions seem to have been very small in comparison with the probable cost of the road.

#### North Wisconsin.

Officers of this company say that contracts have been let for 22 miles of road north from New Richmond, which will, with the 18 miles already built from Hudson to New Richmond, make 40 miles, and this will certainly be finished by March 4, 1875, in compliance with the law giving part of the St. Croix grant to the company. Any further progress will depend upon the action taken by Congress as to extending the time of the grant.

#### Gulf, West Texas & Pacific.

Work is in progress on the extension of this road from Cuero, Texas, north by west to Gonzales, and it is said that there will be no stop until the line is opened to Austin.

#### Pennsylvania Company.

An adjourned stockholders' meeting in Pittsburgh, June 15, the President's report was submitted, a summary of which is telegraphed as follows:

The net earnings of the various roads operated by the company, for the year 1873 were:

Pittsburgh, Fort Wayne & Chicago	\$3,522,022 37
Newcastle & Beaver Valley	192,514 73
Lawrence	76,011 39
Erie & Pittsburgh	484,398 74
Cleveland & Pittsburgh	1,797,013 10
Jeffersonville, Madison & Indianapolis	446,199 86

Total net earnings	\$6,518,170 15
Expenses, rentals and interest	5,279,860 15

Net result to Pennsylvania Company	\$1,238,310 00
Dividends on preferred and common stock	870,000 00

Surplus	\$368,310 00
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The lines are now amply supplied with facilities to meet not only the present demand, but also a much increased volume of business, and the condition of the track and equipment will enable the traffic to be moved with economy and dispatch. On the Fort Wayne road 49 per cent. of the entire line was relaid with new rails, including 6,000 tons of steel rails, and 28 per cent. of the ties were renewed. On the Cleveland & Pittsburgh 35 per cent. of the line was relaid with new rails.

In addition to the lines enumerated, which are operated under leases, the company has also worked during the past year, on account of the proprietary companies, the Ashtabula, Youngstown & Pittsburgh, Indianapolis & Vincennes, Toledo, Tiffin & Eastern, and the completed portion of the Mansfield, Coldwater & Lake Michigan.

#### Erie.

Many rumors are in circulation as to the approaching election, but it seems probable that Mr. Barlow will hold proxies for a majority of the stock this year, as he did last year, and he is not disposed to make his intentions public. It seems to be considered certain that Mr. Watson will not be re-elected.

The new bridge over the Passaic River, at Passaic, is very nearly completed, and trains are already using one track. It is of iron, double tracked, is about 400 feet long and has a draw-span 202 feet long, giving two clear openings of 80 feet. It was built by the Baltimore Bridge Company.

#### Rockford, Rock Island & St. Louis.

In the suit of Stokes against Greene and others, the plaintiff asked that \$1,785,000 of stock held by defendants might be canceled, on the ground that it was issued to them as part of the profits of a contract for building the road, and that no real consideration was ever given for it. The court has decided in favor of the plaintiff, and ordered the stock to be surrendered and canceled.

#### Old Colony Steamboat Company.

The transfer of the property of the Narragansett Steamship Company to this company has been completed, and the new company is now operating the line.

#### Mobile & Alabama Grand Trunk.

This company has returned to the Alabama State Treasurer its bonds endorsed by the State, and will receive in exchange the State bonds for \$4,000 per mile, according to the terms of the law.

#### Southern Minnesota.

In view of the approaching foreclosure sale, bondholders who have signed the agreement of December 4, 1873, are requested by the committee to deposit their bonds and unpaid coupons, with an assessment of \$5.50 per bond, with the Farmers' Loan and Trust Company in New York, on or before July 15. Negotiable receipts will be given for the bonds.

#### Indianapolis, Bloomington & Western.

There are many rumors of embarrassments of this company, caused mainly by the suspension of the banking house of Turner Brothers in New York. Turner Brothers have been the bankers of the company and their suspension is said to have been caused mainly by heavy advances made to it.

#### Central Pacific.

In New York, June 16, forged coupons cut from bonds of this company of Series G were presented for payment to the company's agents, Flak & Hatch, and were at once detected. The coupons were traced through several highly-respectable firms, and it was finally ascertained that the counterfeit had come from Germany. This is all that could be discovered, and therefore it is not known whether counterfeit bonds are afloat, or whether it is only the coupons that have been counterfeited.

Holders of bonds of Series G are requested to present them at the office of the company, No. 9 Nassau street, New York, to have them verified.

#### Kansas Midland.

Arrangements are completed for the extension of this road from Lawrence to Kansas City. Grading is to be commenced at once, the ties have been purchased and a contract for the iron made with the Alliance Rolling Mills, of Alliance, O. An agreement has been made with the Kansas City, Lawrence & Opeka Company by which the Midland secures the bonds voted to that company.

#### North Carolina.

The directors have made application to the Court to dissolve the injunction sued out by some of the stockholders to prevent the consolidation with the Western North Carolina. The suit was to come up this week.

#### Philadelphia & Reading.

This company has been making experiments with the Miller platform and coupler, with a view to introducing them on the road.

#### Painesville & Youngstown.

Work is being pushed forward and it is expected that the road will be opened for business to Niles, O., by July 1.

#### Whitewater Valley.

In Cincinnati, June 15, the Hamilton County District Court gave its decision in the controversy between this company and the Indianapolis, Cincinnati & Lafayette. The decision of the Court of Common Pleas appointing a receiver for the Harrison Branch is reversed, and orders made discharging the receiver

and restoring the Branch to the Whitewater Valley Company.

In the suit respecting the Hagerstown Branch the United States Circuit Court decided, June 13, that the Indianapolis, Cincinnati & Lafayette Company had no claim thereto, and refused to appoint a receiver. These decisions settle a long pending controversy.

#### Lake Shore & Michigan Southern.

Notice is given that Cleveland, Painesville & Ashtabula bonds, which mature July 1, may be exchanged for the consolidated first-mortgage sinking fund bonds of the Lake Shore & Michigan Southern Railway, on presentation at the office of the Union Trust Company in New York. Bonds not exchanged will be paid at maturity by the Treasurer at the Bank of New York, in New York.

#### Pennsylvania-New York Division.

The new depot in Jersey City is slowly approaching completion. The waiting-room, which is very large and handsomely finished, is so nearly completed that it has been opened for use. A new ferry-boat, the New Jersey, has been put on the ferry from New York to Jersey City.

There has been much talk lately of fast trains. One day recently the Washington Limited Express ran from Jersey City to West Philadelphia in one hour and 58 minutes, the average speed being 46 miles an hour. June 16, it is said, the newspaper train left Jersey City nearly half an hour behind time, at 4:38 a. m., and reached Trenton at 5:35, having made the run of 56 miles in 59 minutes, including a stop of one minute at Newark. If this is correctly stated it is probably the fastest time ever made in America, as for over one-third of the distance the road is very crooked, though there are no very heavy grades.

#### Rome, Watertown & Ogdensburg.

The shops at Rome, N. Y., are too small to accommodate the increasing work of the company, and it is reported that new shops are to be built at Watertown.

#### Allegheny Valley.

The laborers employed on the Eastern Extension have been paid off, but other claims have been postponed.

The Pittsburgh Commercial mentions a report that the Pennsylvania Railroad Company would endorse bonds of this company to an amount sufficient to clear off its pressing liabilities.

#### Northern Central.

This company has succeeded in negotiating in London, through Drexel & Co., \$2,000,000 of the new 5 per cent. consolidated mortgage bonds. The bonds are taken at 87½, the company realizing \$1,750,000 from the loan.

The committee of stockholders appointed to confer with the Pennsylvania Railroad Company as to the proposed lease had an interview with the officers of that company in Philadelphia recently. Mr. John H. Hutchinson, of Philadelphia, has been appointed a member of the committee in place of Mr. John Hulme, deceased.

#### Baltimore, Pittsburgh & Chicago.

Track is laid to Defiance, O., the crossing of the Toledo, Wabash & Western, which is 28 miles west of the late terminus at Deahler, and 90 miles from the junction with the Baltimore & Ohio's Lake Erie Division. Trains commenced running through to Defiance June 8.

#### Wisconsin Valley.

The track is completed to Knowlton, Wis., 12 miles north of the late terminus at Junction City, making the road 72 miles long from Tomah to Knowlton. Regular trains are running through. Work on the extension to Wausau, 18 miles north of Knowlton, has been suspended for the present.

#### Palisade & Eureka.

The track is down for 10 miles southward from the Central Pacific at Palisade, Nev., and construction trains are running. Work is progressing steadily.

#### Savannah & Memphis.

Tracklaying is in progress on the extension of the road from Salisbury, Ala., northwest, and the cars are expected to reach Alexander City shortly.

#### Burlington, Cedar Rapids & Minnesota.

The City Council of Burlington, Ia., having accused this company of failing to carry out its contract with the City, reply is made that the contract has been carried out in all essential points. More permanent shop-buildings are to be put up in Burlington as soon as the company's means will permit.

#### Mount Pleasant & Broad Ford.

In the suit of this company against the Pittsburgh, Washington and Baltimore the court charged the jury that the defendant had violated the lease, by not furnishing the requisite equipment, and by not paying the rent at the time agreed on. The jury found a verdict for the plaintiff accordingly. The action was brought in ejectment to dispossess the Pittsburgh, Washington & Baltimore and terminate the lease of that company.

#### United New Jersey Railroad & Canal.

This company has a suit pending in the Supreme Court of New Jersey against the collector of Hudson County, which involves the constitutionality of the railroad tax law of 1873. The company claims that under its original charters it is exempt from all taxes except those provided for in the charters, and that the Legislature has no power to impose any further tax.

#### Louisville & Portland Canal.

Representatives of the United States Government took formal possession of this work, June 10, and hereafter it will be under the charge of the Secretary of War.

#### Indianapolis, Delphi & Chicago.

A meeting of the directors was held in Delphi, Ind., recently, and a proposition was made looking to the raising of a certain amount of money by the counties along the line, the company to provide an amount equal to that contributed by the counties.

#### Kansas City, Wyandotte & Northwestern.

Work on this road is being pushed forward, and tracklaying was commenced June 15. A large amount of iron and two locomotives have been received at Independence, Mo.

#### Pennsylvania.

A fast daylight train has been put on from Pittsburgh to New York which makes the run of 444 miles, in 13½ hours, the average speed being 32½ miles per hour. But three stops are made by this train, at Altoona, Harrisburg and West Philadelphia.

#### Baltimore & Ohio.

This company has purchased a tract of 75 acres at New Creek, West Va., 23 miles west of Cumberland, on which it is proposed to put up new car repair shops. A large stock yard will also be built at that point, where stock in transit will be fed and watered.

#### Hoosac Tunnel Line.

The debate in the Massachusetts Legislature still continues and seems no nearer a conclusion than when it commenced. In the Senate, June 16, the bill of the committee, which had been somewhat amended, was rejected by a tie vote and a sub-

stitute offered by Mr. Bailey was taken up and ordered to a third reading. The Lower House has not reached the main question yet, but is debating the appropriation of \$3,000,000 for the completion of the tunnel and the Troy & Greenfield road, Cairo & St. Louis.

A temporary injunction has been granted to prevent the transfer of the Cairo city bonds to a trustee in St. Louis. The case will shortly come up again and be tried on its merits, when the injunction will be either dissolved or made perpetual.

The injunction issued last February to prevent the issue of \$100,000 Jackson County bonds voted to the road has been dissolved.

#### Buffalo & Jamestown.

A meeting of the directors was held in Buffalo, June 12, when it was resolved to go on and complete the road, provided the town bonds already offered are issued. It was also resolved to adopt the new line surveyed from Gowanda to Dayton, which will shorten the road seven miles, besides decreasing the cost.

#### Missouri, Kansas & Texas.

The suit involving the title to the Osage ceded lands came up for trial in the United States Circuit Court for the District of Kansas last week, and a decision has not yet been reached. The question to be decided is whether at the time these lands were granted to this company and the Leavenworth, Lawrence & Galveston, they were public lands and so included in the grant.

#### Dividends.

Dividends have been declared by the following companies: Philadelphia, Wilmington & Baltimore, 4 per cent., semi-annual, payable July 1.

Panama, 3 per cent., quarterly, payable July 15.

Connecticut River, 5 per cent., semi-annual, payable July 1.

New York & Harlem, 4 per cent., semi-annual, payable July 1 by the New York Central & Hudson River Railroad Company, lessee.

#### Meetings.

The Erie Railway Company will hold its annual meeting at the office, corner of Eighth avenue and Twenty-third street, New York, July 14, from 10 a. m. to 2 p. m. Transfer books are closed from June 13 to July 15.

#### East Alabama & Cincinnati.

This road was recently sold by Col. S. G. Jones, Assignee, to Virgil Murphy and Associates. The purchase is said to have been made in the interest of the Nashville, Chattanooga & St. Louis Company. Two sections of the road are completed, one from Opelika, Ala., north to Buffalo, 20 miles; the other from Gadsden, Ala., northwest to Attalla, 5½ miles.

#### North Pennsylvania.

Several lines are being surveyed from this road northeast to the Delaware to connect with the proposed Delaware River & Bound Brook line. The extension of the Northeast Pennsylvania from Hattboro to the Delaware has apparently been given up, as the new lines are all south of that line.

#### Pennsylvania & Delaware.

At a meeting held in Philadelphia recently the stockholders voted unanimously to ratify the lease of the road to the Pennsylvania Railroad Company. The road has been operated by the Pennsylvania since its completion, but the permanent lease has not been concluded until now.

#### New York & New England.

Notice is given that holders of the first-mortgage bonds of the Boston, Hartford & Erie, commonly called Berdell bonds, can be informed as to the proposed plans for the transfer of the road to the New York & New England Company by communicating with R. Suydam Grant (a director of the latter company) at No. 33 Wall street, New York.

#### Cincinnati Southern.

The following were bidders for the iron trestle work on the Northern Division of this road, beginning at the Ohio River at Ludlow, Ky., and extending southward a few miles: Clarke, Reeves & Co., Philadelphia; N. M. Claflin, Cleveland; Louisville Bridge Company, Louisville; Charles Graham, Cincinnati; Kirchner, Lawrence & Jonte, Cincinnati; Baltimore Bridge Company, Baltimore. The following contractors made proposals for the grading and masonry: Gibbon & Co., S. D. Thompson & Co., Hugh Campbell; Charles Folz & Sons, Patrick McKeone & Co., Walsh, Burns & Fenske, W. H. Mitchell, M. Garretson & Co., Boyle, Roach & Co., Frost, Stearns & Co., Edward Sullivan, Albott Morton, Bates & Bates and Douglas, Dolty & Co., all of Cincinnati; John A. Green & Co., Augusta, Ga.; Thomas Cooper, Springdale, O.; McLaughlin Bros., Baltimore, Md.; Wilcox & Merry, Monroe, Mich.; Walsh & White, Washington, D. C.; Bernard Riley, Winchester, Va.; B. & T. Woods & Co., Covington, Ky.; John Smith, Reisterstown, Md.; C. J. Simpson, Salem, Mo.; Benjamin D. Barton, Carthage, O.; Thomas & P. Shea, Lexington, Ind.; Merritt Easton, Tiffin, O.; C. A. Elston, Somerset, Ky.; Dewees, Gwinn & Platt, Pitkin, Pa.; J. Shotwell, Reading, O.; McNamara & Muer, Little Hocking, O.; Featherly & Phelps, Green Bay, Wis.; James Kelly & Co., St. Louis, Mo.; Vaughn, Arnall & Turk, Somerset, Ky.; Pickering & Crogan, Atienza, O.; Joseph Cooper, Willow Hill, Ill.

The trustees have resolved to readvertise for bids on this three-mile division, commencing at the Ohio River and running into Kentucky. The object of this is to get an acceptable contract on the whole work, including iron trestling, grading and masonry, and also to secure a sufficient delay in the time of awarding the contract, to adjust a few cases of disputed right of way.

An election is to be held in Chattanooga, Tenn., July 11, to decide whether the city shall issue \$100,000 bonds in aid of the road.

#### Boston & Northwestern.

Under this name has been organized a company to build the projected line which is to bring all the roads entering Boston from the west to deep water on the South Boston flats. The line is to extend from the Old Colony Railroad near Savin Hill to a point on the Boston & Albany Railroad a little east of Grantville, whence very short spurs will connect with the Massachusetts Central and the Fitchburg. The incorporators are Edward Atkinson, Thomas B. Williams, Aaron D. Weld, Jr., Edward J. Collins, Robert W. Dresser, Jonas C. Gibson, R. A. Bailou, Aaron W. Russell and James Houghton. A considerable subscription has already been made, and measures are being taken to press the work to completion at an early day.

#### Vermont & Canada.

The directors of this company have made an agreement with the Central Vermont Company which is to put an end to all controversy. The road and property of the Vermont & Canada Company is to be sold to the Central Vermont for \$3,000,000, payment to be made in 30-year 6 per cent. bonds, dated June 1, 1874, and secured by mortgage of the Vermont & Canada road. The Central Vermont further agrees to indemnify the Vermont & Canada against liability on the Ogdensburg & Lake Champlain lease and on the Vermont Central guaranteed bonds, and to pay \$20,000 for past incidental liabilities. The Vermont & Canada claim for back rent from the Vermont Central trustees is to be assigned to the Central



Vermont Company. The Vermont & Canada stock, as fast as exchanged for the new bonds, is to be transferred to a trustee, who is to hold it until the outstanding debt of the Vermont Central and the trustees is arranged for, when the stock is to be canceled and the lease will be at an end and the property pass to the Central Vermont Company in fee.

The Vermont & Canada is to execute to the Central Vermont a power of attorney to use its name in any way it deems necessary, not detrimental to the interests of the Vermont & Canada. If the title under the mortgage is liable to be defeated by reason of this old lease, then the Central Vermont is to hold possession of the Vermont & Canada as lessees, on the same terms as the contract of sale aforesaid, until the title can be perfected, when the Central Vermont shall have right to purchase on the same terms.

In December only half a coupon (\$45,000) will be paid on the purchase bonds; thereafter the full amount of interest will be payable June and December.

The Vermont & Canada stockholders will thus simply exchange their stock for bonds secured on their own property, and will be put to all litigation, and the claims for back rent abandoned. The agreement has still to be voted on by the stockholders, and a meeting will be called as soon as possible.

#### Columbus & Mineral.

A company by this name has been organized to build a railroad from Columbus, O., southeast to Sandy Creek, in Athens County. The line will be nearly parallel to the Columbus & Hooking Valley, and the object in building the road is to develop the coal fields of Perry and Athens counties. The capital stock is to be \$300,000.

#### Hannibal & St. Joseph.

The Treasurer gives notice that \$500,000 Missouri State bonds, known as the Hannibal & St. Joseph issue, which matured June 16, will be paid on presentation at the Company's office, No. 78 Broadway, New York.

#### Yuba City & Colusa.

Surveys are being made for a railroad from Yuba City, Cal., west to Colusa, a distance of about 20 miles. Yuba City is on the Oregon Division of the Central Pacific, 52 miles from Sacramento.

#### East River Bridge.

At a meeting of the directors, held June 10, the Engineer reported that the Brooklyn tower is 222 feet above high water and can be completed this season. The New York tower is up 123 feet and will take two years to complete.

The amended charter was referred to the Executive Committee with power to carry out its provisions. The same committee was empowered to recommence work at once on the towers and anchorages. A call was ordered for the tenth installment of the stock, which will be payable June 25.

#### Forced Sales of Bonds.

In New York, June 10, at an auction sale of securities \$3,000 of Canada Southern Bridge Company's first-mortgage 7 per cent. gold bonds were sold at 70, and \$7,000 of New York & Oswego Midland convertible bonds at 4%.

#### New York & Oswego Midland.

Mr. L. H. Meyer, Chairman of one of the committees of first-mortgage bondholders, calls a meeting of those bondholders at the Cooper Institute, New York, Friday, June 19, at 4 p. m.

#### Renewals of Railroad Patents.

The Senate Committee on Patents has decided to report adversely on the applications for extension of the Tanner car-brake and the Anson Atwood car-wheel patents.

#### Recent Bond Negotiations.

The recent issue of first-mortgage 6 per cent. sterling bonds of the Lehigh & Wilkesbarre Coal Company, secured by the guarantee by the Central Railroad of New Jersey, was sold in London at 90. The Northern Central road, \$2,000,000 consolidated mortgage 6 per cent., were sold at 87%.

#### Hooaac Tunnel.

During May the bench rock was removed from 603 feet of the tunnel between the west end and central shaft, leaving 361 feet to be removed. It has been decided to use 18-inch pipe, instead of the open drain at first proposed, to remove the water. The drain pipes and the ties for the track from the east end to the central shaft have been carried into the tunnel.

#### Grand Trunk.

This company has been inviting proposals for 50 locomotives of standard (4 ft. 8 1/2 in.) gauge.

It is said that an express train is to be put on to run through from Boston to Chicago by this line, making pretty fast time. The run from Montreal to Toronto (333 miles) will be made in 11 hours. A complete new outfit is being prepared for this train. If this train is run from Boston to Montreal by the Vermont Central line the distance from Boston to Chicago will be 1,181 miles against 1,006 by the Boston & Albany, New York Central, Great Western and Michigan Central.

#### Mount Ephraim & Blackwoodstown.

A company which has filed articles of incorporation with the Secretary of State of New Jersey purposes building a narrow-gauge line from Mount Ephraim, N. J., south to Blackwoodstown, 6 1/2 miles. It will be an extension of the Camden, Gloucester & Mount Ephraim road. The capital stock is to be \$65,000.

#### St. Paul & Pacific.

In the suit for a foreclosure and the appointment of a receiver in the United States Court at St. Paul, Minn., the arguments were commenced last week. The company denies all the allegations of the complaint, and claims that there has been no misapplication of funds. The arguments continued several days and no decision has been yet announced.

#### Rockford, Rock Island & St. Louis.

In the United States Circuit Court in Chicago, June 11, a bill in chancery was filed for the foreclosure of the first mortgage on the road. The court is asked to appoint a receiver pending the decision in the foreclosure suit.

#### Salt Lake City & Coalville.

A company has been organized to build a railroad from Salt Lake City, Utah, east 35 miles to Coalville, when connection will be made with a branch of the Union Pacific. The road will pass through a mining and coal country.

#### International & Great Northern.

Pretty heavy shipments of stock are being made from Rockdale, Tex., the southwestern terminus of the International Division. Most of these go to Longview, and over the Texas & Pacific and Cairo & Fulton. Cattle are also beginning to come over the Galveston, Harrisburg & San Antonio to the International & Great Northern for shipment northward.

#### West Point & Hanover Junction.

A contracting firm has offered to build this road, from West Point, Va., northwest to the Chesapeake & Ohio at Hanover Junction, provided a certain amount is subscribed to the stock.

#### Baltimore & Ohio.

The Washington Star says: "The depot at Washington has been planned, and will be a large and elegant architectural structure, at the lowest part of the grade of Delaware avenue,

hitherto a disused street, and for the greater part of its length scarcely intelligibly outlined, traversing, in the main, the soggy and wet grounds along the old Tiber and James' Creek. If no obstruction be offered this work will be at once begun, and the excavations already made show a good foundation. The railroad will be led out the avenue between the iron railings, and will make the junction with the Baltimore Branch by a cut back of the Soldiers' Home in Bladensburg. At the junction, near Terra Cotta, will be repairing shops and a hotel station."

#### New River.

Arrangements are being made to put this line under contract as soon as the surveys can be completed. The line selected is from the Atlantic, Mississippi & Ohio at New River Bridge, north by west, following the New River Valley to the mouth of Greenbrier, where connection will be made with the Chesapeake & Ohio. The distance is about 65 miles.

#### Tennessee Central.

This company having asked the Nashville, Chattanooga & St. Louis to guarantee its bonds, that company declined, but offered to complete and equip the road from Huntington to Trenton, on condition that Trenton should issue the balance of its \$50,000 subscribed, Milan and Huntington should each subscribe \$10,000 additional, and that the balance due on individual stock be collected and, with the various bonds, be deposited as security with the Treasurer of the Nashville, Chattanooga & St. Louis. It is not thought that this offer will be accepted.

#### Pittsburgh, Wheeling & Kentucky.

This company has once more made application to the counties of Brooke and Ohio, West Va., this time for about \$300,000, which is needed to finish the road. Both counties have already subscribed largely, furnishing pretty much all the money that has been put in the road.

#### Marietta, Pittsburgh & Cleveland.

This road has been finally completed and put in good order, and through trains are now run from Marietta, to Pittsburgh and to Cleveland. The whole length of the road from Marietta, O., to Canal Dover is 98 miles. It connects at Cambridge with the Central Ohio, at Newcomertown with the Pittsburgh, Cincinnati & St. Louis, and at Canal Dover with the Lake Shore & Tuscarawas Valley and the Tuscarawas Branch of the Cleveland & Pittsburgh.

#### The Increase in Freight Tariffs in Germany.

From an article in the *Monteur des Interets Materiels*, of May 24, we translate:

Several days ago various journals had announced that the Council of the Confederation had finally agreed to the increase of the tariffs, and that the promulgation of this measure would shortly follow. Nevertheless it seems that it meets with resistance on the part of certain States represented in this Council. But especially is it opposed by a great number of manufacturers, in so far as it will apply to the freight tariffs. They maintain that the result of the last year's operations was not generally unfavorable. When this really was the case, the cause must be looked for, in their opinion, in various extraordinary circumstances, such as the beginning of working of lines necessarily unproductive for a time, etc. Certain railroads even have yielded brilliant results, according to the opposition. But even were it not so, they consider that the last year's operations, during which the price of materials has reached an extraordinary height, should not be invoked in support of a measure so essential to the economic life of the country. The German manufacturers assert moreover that a merchant could not cover an increase of his expenses by raising the price of his goods. He must first seek to learn what improvements can be introduced, what economies realized in the business, and in this respect much remains to be done by the railroad companies. At a convention in Dusseldorf, called by the "Society for the Protection of the Economic Interests of the Rhine Provinces and of Westphalia," these views were fully developed.

Nevertheless, an announcement which Mr. Achenbach, the Minister of Commerce, has just made to the Second Prussian Chamber shows that the Council of the Confederation will not hesitate to decide in accordance with the proposition which has been made to it by the Chancellor of the Confederation. Prince Bismarck, hitherto a quite decided opponent of an increase in the freight tariff, has finally accepted it, in consideration of the results of the railroad operations during the last year, results gathered by the Department of Railroads, as also in consideration of the precarious situation of the private railroads. Consequently the Chancellor of the Confederation has proposed to the Council of the Confederation to decide that there is no objection to an increase of the freight tariffs, not exceeding, on the average, 20 per cent. At the same time the Chancellor of the Confederation proposed the basis of a general reform of tariffs, to be introduced as soon as the preparatory labors should permit.

The statement accompanying this proposition makes known the financial condition of 35 German companies, from 1867 to 1873. In the first of these years the extent of their lines in operation was about 7,055 miles. Their construction had absorbed \$577,182,273 gold, or \$81,788 per mile. In 1873 the length of the lines in operation was about 9,815 miles, their capital cost had reached at the same time \$910,569,800, or \$92,775 per mile. Thus the length of the lines has increased during the above-mentioned period by 39 per cent., and the cost per mile by 13 per cent. Adding thereto the ten lines which were not opened for business until after 1873, we obtain a total of 11,459 miles, having required an expenditure of \$1,099,276,882, or \$93,315 per mile.

Passing to the results of operations, the Chancellor of the Confederation finds that the receipts of the 35 railroads in question reached in 1867 a total of \$78,896,585 (\$11,185 per mile), against \$135,807,902 (\$13,835 per mile) in 1873. As to the expenses, in 1867 they were \$5,500 per mile and \$8,570 in 1873, which are equivalent to 48.1 and 59.5 per cent. of the gross receipts. Thus the total net earnings, which have been \$40,900,550 in 1867 and \$55,003,675 in 1873, have fallen from \$5,685 per mile to \$5,265, from 51.9 per cent. of the gross receipts to 40.5 per cent., and from 7.1 per cent. on the capital invested to 6 per cent. Taking into account the ten roads mentioned above, we arrive at the following results: Total receipts, \$13,058 per mile; expenses, \$7,976, or 61.1 per cent. of the gross receipts. At the same time the net earnings fall to \$5,082 per mile and to 5.4 per cent. of the capital invested. The expenses above represent those only due to the working properly so called. But when we add to the account those necessitated by reparations, etc., the surplus falls to \$4,300 per mile and to 4.6 per cent. of the cost of construction; or, including the ten lines more recently opened for traffic, the surplus is reduced to \$3,872 per mile and 4.1 per cent. of the cost of construction. From 1867 to 1873 the receipts per mile have increased, but the net earnings have diminished, the cost of working having undergone an increase of 25 per cent.

The cause of this, that during the last seven years the salaries of the employees have increased by 25 per cent., the labor of workmen by about 50 per cent., while the prices of materials have increased by 100 per cent. and over. The Chancellor establishes, moreover, that the increase of 20 per cent. granted would not yet assure a rise in the average increase of the railroads from 4.1 per cent. to 5.5. His report indicates finally that the increase should be as small as possible

for each article, not applying at all to articles of food, and that it would be desirable to reach a greater uniformity in the rates of the different articles. But Prince Bismarck claims in exchange that the responsibility of the railroads should be extended further.

Let us mention, further, that the administrations of the German railroads held a meeting a few days ago in view of the proposed increase which they have determined to make. Although conceding that some time will pass before the new tariff can be applied also to through freights to foreign countries, the meeting nevertheless was of opinion that the increase would encounter no obstacles, either in Belgium, in France, or in Austria. The latter country would even await the example of Germany to proceed also to an increase of its tariffs.

#### THE MASTER CAR-BUILDERS' ASSOCIATION.

##### Report of the Eighth Annual Convention.

##### WEDNESDAY'S SESSION.

The eighth annual convention of this Association was called to order at 10 a. m., June 10, in College Hall, Cincinnati, by the Vice-President, Mr. V. D. Perry, of the Hartford, Providence & Fishkill Railroad, the President, Mr. J. W. Van Houten, not being present.

The following report is taken from the Cincinnati Commercial:

The convention was welcomed in a brief speech by Mr. G. W. C. Johnston, Mayor of Cincinnati.

Mr. G. W. P. Atkinson, on behalf of the Executive Committee of Manufacturers and Merchants, read the following programme of entertainments provided by them for the master car-builders during their stay in Cincinnati:

Wednesday evening, visit to Robinson's Opera House. Thursday, a carriage drive through the suburbs in the afternoon, and a balcony serenade at the Gibson House in the evening. Friday afternoon, an excursion on the Ohio River on the steamboat Ben Franklin.

This invitation was accepted with thanks.

Mr. M. P. Ford, of the Pittsburgh, Cincinnati & St. Louis, was chosen Vice-President *pro tem.*, and Mr. Leander Garey, of the New York Central and Hudson River, Secretary.

##### MEMBERS PRESENT.

The following members answered to the roll-call: J. N. Mileham, Buffalo; Enos Varney, Fitchburg Railroad; V. D. Perry, Hartford, Providence & Fishkill; Leander Garey, New York Central & Hudson River; F. D. Adams, Boston & Albany; Ambrose Ward, S. W. Myers, Robert S. Ramsey, Pennsylvania Railroad; W. F. Smith, Cleveland, Columbus, Cincinnati & Indianapolis; M. P. Ford, Pan Handle; G. W. Demarest, Northern Central; John McVay, Pan Handle; M. W. Dickson, Concord Railroad; Christopher Woods, Union Line; A. Langmaid, Northern, of New Hampshire; J. L. Hackathorn, Kentucky Central; E. Lockwood, Camden & Amboy; W. H. H. Allison, Cincinnati, Hamilton & Dayton; W. B. Snow, Illinois Central; C. A. Smith, Erie Railway; M. C. Andrews, New York, New Haven & Hartford; H. Longest, Richmond & Danville; R. Gunning, Allegheny Valley; J. Lightner, Boston & Providence; Wm. H. Trainham, Richmond, Fredericksburg & Potomac; Willis Davis, Empire Line; F. Childs, Great Western, of Canada; S. Griffith, Indianapolis, Cincinnati & Lafayette; George Rome, New York Central & Hudson River; John Kirby, New Orleans, Mobile & Texas; H. B. Moore, Indianapolis & St. Louis; D. Sutherland, Detroit Car Works; W. R. Davenport, Erie Car Works; J. D. McIlwain, Lake Shore & Tuscarawas Valley; J. Gill Blain, Gill Car Works, Columbus, O.; M. Sessions, Taunton Car Company.

The following members came after the roll was called: Charles C. Williams, West Jersey; W. J. Worth, Philadelphia, Wilmington & Baltimore; E. Martin, Atlantic & Pacific; J. W. Holmes, Atlantic & Great Western; S. S. Pison, Louisville, Cincinnati & Lexington; John B. Vaughan, Richmond & Danville; H. Krouse, Terre Haute & Indianapolis; L. R. Hartman, St. Louis & Southeastern; H. O. Wadlie, Illinois Central; T. Lee, Pittsburgh, Fort Wayne & Chicago; J. M. Leech, Pittsburgh, Cincinnati & St. Louis; G. Hibbert, Ohio & Mississippi; A. J. Allen, Indianapolis, Bloomington & Western; W. E. Partridge, Compiler of the Master Car-Builders' Dictionary.

##### PRESIDENT'S SPEECH.

Mr. Perry, the Chairman, addressed the Association as follows:

"I am obliged to say to you, with much regret, I assure you, that for reasons unknown to myself our worthy President, Mr. Van Houten, has failed to appear before you this morning. Under these circumstances, you will readily see that I am placed in the position which compels me to act as your presiding officer very unexpectedly, and with scarcely any notice. Perhaps, if I had ample time to prepare myself, I should not prove a success as a presiding officer; but, be that as it may, I shall endeavor, with your assistance and forbearance, to do what all of us are expected to do, and that is, never to shrink from the performance of any duty imposed upon us, no matter how arduous it may be.

"It is not necessary for me to mention the great importance of these, our annual gatherings. Our main object is to improve our capacities and knowledge as bearing on our vocation, and, in my opinion, this can only be accomplished by a free discussion of the various subjects which are from time to time presented to your Association, and requiring your investigation. There are many important questions to be brought before you during our present session, and, in the discussion of them, should I err in my rulings, I beg to assure you it will be a mistake of the head and not of the heart."

##### HEATING, LIGHTING AND VENTILATION OF CARS.

The committee on this subject submitted a long report, signed by W. E. Chamberlain, of the Boston & Albany and A. Gleason, of the Old Colony. It concluded as follows:

"The plan recently introduced by Messrs. Sanborn & Gates, and described in the replies of those gentlemen, probably involves a more comprehensive reach of the subject than any other, and is worthy the attention of railroad men. It provides for first filtering or straining the air through very fine screens before it enters the car, and then distributing a full supply in the dome till it is gradually and gently forced downward and so out at the bottom of the car. It can undoubtedly be moved downward as easily as upward, and the great advantage of downward currents is to secure a better diffusion; and when artificial heat becomes necessary, it has a tendency to keep the heat down in the bottom of the car. This plan also affords advantages for heating or cooling the supply of air admitted, if desired, and is adapted for all seasons of the year.

"It is, perhaps, too soon to attempt to say what objections may be brought against this system, but that effective ventilation for cars may be secured in this way is undoubted, and if no objection is found to the mechanical appliances, we see no reason for criticizing it. Your Committee are fully convinced that heating and ventilating apparatus should be made to co-operate together, when both are required; but since the latter alone is always necessary, they should be capable of easy separation, or be adjusted so that the one may modify the other.

"We believe that the requirements of the case will be most fully met by some plan for heating by which the heat is dis-